

**RESEARCH INFORMATION
INFRASTRUCTURE FRAMEWORK
FOR
AUSTRALIAN HIGHER EDUCATION**

Report of the
Department of Education, Science and Training

Systemic Infrastructure Initiative

Information Infrastructure Advisory Committee

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CONTENTS

| | | |
|-------------|--|-----------|
| 1.0 | EXECUTIVE SUMMARY | 3 |
| 2.0 | VISION | 7 |
| 3.0 | THE INFORMATION INFRASTRUCTURE | 7 |
| 4.0 | INTERNATIONAL DEVELOPMENTS AND COORDINATION | 9 |
| 5.0 | AUSTRALIAN RESEARCH INFORMATION INFRASTRUCTURE | 11 |
| 6.0 | ISSUES | 13 |
| 7.0 | INFRASTRUCTURE GAPS | 15 |
| 8.0 | STRATEGIC CONSIDERATIONS | 16 |
| 9.0 | PRIORITY AREAS – 2003 | 17 |
| 10.0 | OUTCOMES AND RECOMMENDATIONS | 23 |
| 11.0 | APPENDICES | |
| | A Advisory Committee | 25 |
| | B Information Infrastructure Related Projects Funded 1991-200228 | 37 |
| | C Criteria for Assessing Proposals | 39 |
| | D Resource Discovery Mechanisms | 41 |
| | E Subject Gateways | 43 |
| | F Research Skills | 45 |
| | G Humanities and Social Sciences Journals | 47 |
| | H Refereed Journal Literature | 49 |
| | I Non-Bibliographic Digital Data | 51 |
| | J Collaborative Storage Facilities for Research Publications | 53 |
| | K E-print Repositories | 55 |
| | L Digital Theses | 57 |
| | M Electronic Publishing | 60 |
| | N Management of Access to Digital Resources | 60 |

| | | |
|---|--|----|
| O | Australian Research Publications and Manuscripts | 62 |
| P | Projects Funding Summary and Timeline | 64 |

1.0 EXECUTIVE SUMMARY

1.1 The vision of the Australian Research Information Infrastructure Framework is to facilitate access to information infrastructure resources which will optimise the efforts of researchers in the higher education sector to create, manage, discover, access and disseminate knowledge. Access to the research information infrastructure should not be constrained by the institutional affiliations, geographical locations or disciplines of individual researchers.

1.2 High quality research and research training are crucial to the success of Australian universities and to the economic, social and cultural well-being of the broader community. The theoretical and applied research undertaken within the higher education sector contributes to the development of knowledge and innovation nationally and internationally.

1.3 Researcher effectiveness depends on access to, and use of, those resources which constitute the physical and information infrastructures. The provision of physical facilities, such as buildings, equipment and communication networks, is essential to research but of little long-term value if researchers do not have access to the resources necessary to enable them to review the work of other scholars, access information and data in a variety of formats and to disseminate the results of their own endeavours.

1.4 Development of the national research information infrastructure has been somewhat uncoordinated and largely regarded as the responsibility of individual institutions. Collaboration among libraries has improved the effectiveness of institutional investment and, combined with access to libraries internationally, provides some Australian researchers with the majority of published information required for their research.

1.5 This access is not universal and some researchers, particularly those at smaller or regional institutions and those in specialised or emerging disciplines, often have difficulty accessing required information resources. Their difficulties are compounded by changes which are occurring in the scholarly communication process. Although there are now improved mechanisms for discovering the existence of information resources, access to them is often restricted by cost, licences and other conditions.

1.6 In recent years, much of the publishing part of the infrastructure has been undergoing significant change as publishers struggle to cope with changes in scholarly communication and the influence of computer and communication technologies. An increasing number of researchers are experiencing difficulty disseminating the results of their research using traditional publication mechanisms. Competition for publication in refereed journals has intensified as the number of researchers increases worldwide and their tenure and promotion depends heavily on publication success. The chances of most researchers publishing a monograph are slim unless they are able to underwrite the cost or their work has appeal beyond the academic community. Inadequate recognition is currently given to those scholars who publish only in digital, networked formats.

1.7 Internationally, key stakeholders in the academic community have established organisations, such as SPARC (Scholarly Publishing and Academic Resources Coalition) and the Coalition for Networked Information. These organisations provide

opportunities for the international academic community to regain control of scholarly publishing.

1.8 Computing and communication technologies provide new opportunities for the creation, management, storage and dissemination of information. Their use, however, requires infrastructure investment, the acquisition by researchers of different skills and the re-assessment of many aspects of the scholarly communication process. Most importantly, optimum deployment of technology can be achieved only by collaborative effort by the scholarly community guided by clear strategies and commitment to a common vision.

1.9 These opportunities and needs have been recognised by national strategic investment in information infrastructure in Singapore, Canada, United Kingdom and the United States and more limited initiatives by some other nations. A distinguishing characteristic of most such initiatives is the role of advisory bodies which provide system-wide opportunities for stakeholder involvement. There is no similar body in Australia which brings together government, academic, library and information technology professionals.

1.10 No Australian university has the resources or capacity to act unilaterally to effect changes which will influence the international scholarly communication environment in any lasting way. Expenditure on the information infrastructure and the research output of even the most productive universities are too small to make significant impact.

1.11 Only by collaborative action, nationally and internationally, can Australian universities hope to provide the infrastructure and resources which will enable researchers to perform effectively in a rapidly changing environment. Experience in Western Europe, United Kingdom, Canada and the United States testifies to the benefit of financial incentives provided by government. This support is required to encourage collaboration, innovation and investment in the information infrastructure and to highlight changes in scholarly communication.

1.12 These changes affect all aspects of research and are most evident in the publishing process. The academic community has largely lost its control and influence in the commercial print publication environment. Technologies are available which have the potential to revolutionise the ways in which research information is created, manipulated and published. If the academic community fails to take advantage of the technology, it will be shackled further by commercial entities interested primarily in profit and shareholder returns.

1.13 In April 2002, the Hon. Brendan Nelson, Minister for Education, Science and Training, established an advisory committee on information infrastructure to allow key stakeholders to provide advice on the research information infrastructure needs of the higher education sector. The Committee was requested to identify gaps and to provide advice on priorities for funding in the 2002 round of the Systemic Infrastructure Initiative.

1.14 After consultation with key stakeholders, the Committee identified three main areas in which action was required:

- discovery and management of research information
- access to research information resources
- creation and dissemination of Australian research information

1.15 In the course of its deliberations, the Committee recognised:

- importance of fostering the dissemination of Australian research outcomes
- need for ongoing investment in the information infrastructure
- benefits of past and future collaboration among institutions and among funding bodies
- desirability of a systemic mechanism for funding new priorities
- difficulty of separating the information infrastructure needs of research from those of teaching and learning
- lack of a mechanism to fund the complementary teaching and learning information infrastructure
- desirability of an advisory body to consider the wider strategic implications for the Australian higher education sector of changes in the information infrastructure environment
- benefits of a structure for coordinating the management of information infrastructure programmes funded by the Systemic Infrastructure Initiative

1.16 The Committee identified twelve broad priorities costing approximately \$20 million and was cognizant that not all could be funded in 2003. It recommended that consideration be given to staging funding over several years. Priorities identified were:

- **Discovery and Management of Research Information**
 - Research Discovery Mechanism (Appendix D)
 - Subject Gateways (Appendix E)
 - Research Information Skills Training (Appendix F)
- **Access to Research Information Resources**
 - Humanities and Social Sciences Resources – JSTOR (Appendix G)
 - Refereed Journal Literature – ISI Web of Science back files (Appendix H)
 - Non-Bibliographic Data Sources (Appendix I)
 - Storage Facilities (Appendix J)
- **Creation and Dissemination of Australian Research Information**
 - E-print Repositories (Appendix K)
 - Digital Theses (Appendix L)
 - E-publishing (Appendix M)
 - Managing Access to Digital Publications (Appendix N)
 - Australian Publications and Manuscripts (Appendix O)

1.17 The Committee considered the feasibility of assigning funding priorities to each of the projects. This proved difficult as the recommended projects do not exist in isolation from one another. As a consequence of consultation with the user community, a large number of potential projects were identified and a selection process undertaken.

1.18 The Committee elected to recommend only those projects which had the capacity to provide the greatest benefits to Australian research and which were achievable within a 12 to 24 month timeframe.

1.19 They constitute an integrated package of initiatives intended to improve the resources available to Australian researchers at a systemic level. The successful implementation of the identified projects, and future support for related initiatives, will provide researchers with an information infrastructure comparable to that available to their peers internationally.

1.20 Recommendations

The Information Infrastructure Advisory Committee recommends that:

1. funding for the priorities identified in Appendices D to O of this report be allocated from the Systemic Infrastructure Initiative to allow implementation commencing in 2003
2. institutional contributions to the projects be limited to their obligation to sustain the projects after Systemic Infrastructure Initiative funding has been utilised
3. expressions of interest be sought from consortia, with lead universities listed in Schedule 1 of the *Higher Education Funding Act 1988*, to achieve the objectives listed for each project. Where more than one bid is submitted for an expression of interest, potential consortia be required to consult with the aim of forming a single consortium
4. multiple projects designed to deliver similar outcomes not be funded
5. an Information Infrastructure Projects Management Committee have oversight of funded projects and their evaluation
6. a secretariat be funded to oversee the implementation of Information Infrastructure programmes including liaison with other funding bodies and support for the Advisory Committee
7. consideration be given to the establishment of a body to advise on the wider strategic implications for the Australian higher education sector of changes in scholarly information and its infrastructure needs to support teaching, learning and research.

2.0 VISION

2.1 The vision of the Australian Research Information Infrastructure Framework is to facilitate access to information infrastructure resources which will optimise the efforts of researchers in the higher education sector to create, manage, discover, access and disseminate knowledge. Access to the research information infrastructure should not be constrained by the institutional affiliations, geographical locations or disciplines of individual researchers.

2.2 High quality research and research training are crucial to the success of Australian universities and to the economic, social and cultural well-being of the broader community. The theoretical and applied research undertaken within the higher education sector contributes to the development of knowledge and innovation nationally and internationally.

2.3 Researcher effectiveness depends on the ability of individuals to access and use a mix of resources which constitute the physical and information infrastructures. The provision of physical facilities, such as buildings, equipment and communication networks, is essential to research but of little long-term value if researchers do not have access to the resources necessary to enable them to review the work of other scholars, access information and data in a variety of formats and to disseminate the results of their own endeavours.

2.4 Australia needs to invest more strategically in information resources and services utilised by the higher education sector and associated research organisations. This investment must complement and extend institutional-level activities by providing a rational national framework within which priorities can be identified, funding allocated and projects implemented and evaluated.

2.5 The Information Infrastructure Advisory Committee believes that optimum benefit can be derived from available resources by:

- collaboration among funding bodies
- establishing priorities
- concentrating funding on identified priorities
- encouraging system-wide collaboration
- adhering to international standards, preferably those based on Open Systems protocols
- managing and evaluating programmes more systematically
- continuing stakeholder involvement including the involvement of researchers in the identification of priorities.

3.0 THE INFORMATION INFRASTRUCTURE

3.1 The information infrastructure is a complex amalgam of people, technologies, content, skills and facilities. These elements combine to enable the creation, manipulation, management and dissemination of information and its transformation into knowledge and innovation.

3.2 The national information infrastructure is an interlinking set of infrastructures which support education, commerce, industry, government and other sectors of society. Some elements of the national infrastructure are part of an international infrastructure which facilitates the transfer of knowledge among societies. With the

increasing globalisation of commerce, effective participation in the international information infrastructure can have significant national economic and cultural implications.

3.3 In order to participate effectively in the global knowledge, commercial and cultural environments, Australians need access to a national information infrastructure whose elements are robust, pervasive, diverse, continually evolving and able to meet their particular requirements at times appropriate to their need. This infrastructure must be able to interact with similar infrastructures internationally by adherence to a range of technical and operational protocols and standards. Much of this infrastructure exists but not all potential participants have easy access at an affordable rate, nor do they have the skills which will enable them to optimise their use of facilities and resources.

3.4 These constraints also apply to the research information structure. Taken as a whole, Australia appears to have the same infrastructure elements as peer countries but access to those components is often more varied, less easy and more expensive. Access to the technical information infrastructure varies among universities particularly those at distance from the AARNet hubs. Smaller and regional institutions tend to have access to a narrow range of information resources despite pursuing often quite diverse research.

3.5 Some of the technical access issues will be addressed by the Higher Education Bandwidth Advisory Committee at a systemic level. The availability of accessible and affordable communications networks is a major issue facing the Australian higher education sector in general and a number of regional universities and campuses in particular. The provision of reliable and pervasive bandwidth is necessary to allow scholars to undertake research which is dependent on access to remote resources, collaborative investigation and the manipulation and exchange of very large datasets. Investment in the information infrastructure will be ineffective if there is not concomitant investment in computing and communication infrastructure.

3.6 Elements of the infrastructure are of varying benefit and relevance to individuals and institutions depending on their requirements at different times. In its totality, however, the national higher education information infrastructure

- assists institutions to achieve their goals relating to quality research, learning and teaching
- enhances the capability of individual scholars to create, access, use and disseminate knowledge and information
- promotes effective research outcomes and collaboration among researchers
- contributes to the provision of more flexible and individual-centred learning environments
- provides Australian researchers with resources comparable to those available to their international colleagues
- contributes to, and benefits by, the development of an international information environment.

3.7 Australians tend to be early and innovative adopters and adapters of technology. This has applied particularly to communication technology. The installation of AARNet was among the first national networks in the world of its kind to be available to the general academic community. Australian universities recognised computer and information literacy skills as essential graduate attributes and instituted training before many of their peers internationally. Australian researchers, particularly in the humanities and social sciences, have had long standing difficulties

accessing information resources necessary to inform their work. These challenges have changed with improvements in transport, communication, publishing and other technologies but they remain barriers to the undertaking and dissemination of research.

3.8 With the exception of unique heritage resources, Australian scholars as a whole have access to published information resources comparable to their peers internationally. This access, however, is often at a higher cost than in North America or Western Europe. Australian academic libraries nationally acquire less of the total international scholarly publishing output than 37 universities in the state of California.¹

3.9 Distance between institutions, teaching and research offerings at particular institutions, and lower overall resource levels are among the constraints which affect the extent to which Australian universities can provide access to information resources. There is minimal duplication among Australian university library collections and there are efficient interlending and other resource sharing mechanisms. There is, however, simply less money in the system than in peer countries and it is necessary to be more strategic in the deployment of available resources.

4.0 INTERNATIONAL DEVELOPMENTS AND COORDINATION

4.1 The information infrastructure is often perceived as a progeny of the Internet and narrowly portrayed as communication networks and associated software. This fails to recognise the history and diversity of the information infrastructure which has existed for centuries albeit comprised of different technologies, content and facilities. William Caxton used technology that was revolutionary in the Fifteenth Century to produce books. Works produced by the printing press remain as much part of the information infrastructure as the Genome database or the music of Percy Grainger. Sound recordings, images and other formats collected and organised by libraries, archives and other agencies are also part of the infrastructure and are complemented by information resources which are available only in digital formats. To be a useful part of the national information infrastructure, however, resources need to be accessible.

4.2 A plethora of differing models have been created to map the diversity and interrelationships of the information infrastructure. These models vary depending on the emphasis given to particular segments. Thus a model which seeks to explain use of the infrastructure to support teaching and learning may differ from one devised to map use by the general community.

4.3 In the United Kingdom, the Joint Information Systems Committee (<http://www.jisc.ac.uk/>) is responsible for developing technical and information infrastructure facilities and services for both the further and higher education sectors. JISC perceives the information infrastructure in terms of:

- Provision: the storage and delivery of content

¹ 23 California State University campuses, 9 University of California campuses, University of San Diego, University of Southern California, Stanford University, Pepperdine University and University of San Francisco.

- Fusion: the bringing together of content from multiple providers either by machine to machine, brokers and aggregators or portals which are visible to end users
- Infrastructure: shared middleware services which support other activities
- Presentation: interaction with the end users in a direct and visible manner to give them access to content

4.4 JISC is a strategic advisory committee working on behalf of the funding bodies for further and higher education in England, Scotland, Wales and Northern Ireland. It also works in partnership with the Research Councils. JISC has off-the-top funding to support the innovative application and use of information systems and information technology for teaching, learning and research across the higher and further education sectors. This responsibility covers the network infrastructure, information and communications technology, information services, and high quality materials for education. Its central role and funding encourages cost-effective, comprehensive and well focused uptake of new technologies and methods.

4.5 In Canada, government initiative has resulted in a strategy designed to promote excellence in Canadian culture, learning and innovation. This strategy has two aspects:

- *Achieving Excellence – Investing in People, Knowledge and Opportunity* which recognises the need to consider knowledge as a strategic national asset. It focuses on strengthening science and research capacity and on ensuring that this knowledge contributes to building of an innovative economy.
- *Knowledge Matters – Skills and Learning for Canadians* which recognises that a country's greatest resource in the knowledge society is its people. It looks at what can be done to strengthen learning in Canada, to develop people's talent and to provide opportunity for all to contribute to and benefit from the new economy.

4.6 Part of this strategy involves strengthening the research information infrastructure by funding a \$50 million (Canadian) digital library for sixty four universities. This project seeks to provide desktop access to electronic versions of scholarly journals and research databases, primarily in science, engineering, health, and environmental disciplines. \$30 million has been received from universities and provincial governments, and the Atlantic Canada Opportunities Agency, as well as \$20 million from the Canada Foundation for Innovation. The project recognises that systematic access to published research constitutes an integral component of a modern, world-class research infrastructure.

4.7 In 1991, the Government of Singapore instituted planning and investment to develop a national information infrastructure which would enable the country to be competitive in a global world economy. This initiative has involved national coordination, multi-million dollar investment and adherence to international standards. While the much of the attention has been on community access to information resources, there has also been considerable investment in resources to support research.

4.8 National government funding and coordination for the information infrastructure is less evident in the United States of America. There is considerable government financial support for developing and deploying advanced network applications and technologies to create Internet2 in partnership with universities and

industry. During the Clinton administration, there was support for the development of a national information infrastructure to ensure the availability of information resources to citizens at affordable prices (www.ibiblio.org/nii/NII-Agenda-for-Action.html). Significant funding is provided to universities through the National Science Foundation (www.nsf.gov) and the National Endowment for the Humanities (www.neh.gov).

4.9 Much of the support for innovation in the research information infrastructure, however, is derived from a mix of state government funding, institutional resources and grants from charitable foundations. Several state governments, most notably Ohio (www.ohiolink.edu), have provided significant funding over a number of years for the establishment and maintenance of information infrastructures supporting research as well as teaching and learning. Major charitable trusts, such as the Andrew W Mellon Foundation, Carnegie Corporation and the Pew Charitable Trusts, provide seed funding for projects aimed at improving the research information infrastructure.

4.10 A distinguishing characteristic of information infrastructure initiatives in Canada, United Kingdom and the United States is the role of advisory bodies which provide system-wide opportunities for stakeholder involvement. No such body exists in Australia.

4.11 There would be potential benefit from the establishment of a body to provide advice to the sector on the strategic issues associated with the future development, deployment and funding of information infrastructure to support the gamut of activities undertaken by Australian universities.

4.12 The Advisory Committee also recognised the value of an ongoing secretariat funded from the Systemic Infrastructure Initiative to manage the implementation and evaluation of programmes. The secretariat would be responsible for ensuring stakeholder involvement including communication to them of project performance.

5.0 AUSTRALIAN RESEARCH INFORMATION INFRASTRUCTURE

5.1 The research information infrastructure is but one segment of a larger and more complex infrastructure which is necessary for institutions to achieve their missions. Core functions of universities include the use of information resources to inform research, teaching and learning, to transmit knowledge and to assist the achievement of efficient institutional administration and governance.

5.2 Complementary infrastructures include those associated with communications networks, computing and network access facilities, buildings, administrative systems, and teaching and learning. Each of these infrastructures is necessary and provides the structure or framework on, and around, which institutions and individuals function.

5.3 The research information infrastructure framework must complement these functions but it must also cater for the unique needs of the research environment.

5.4 A relevant model for the research information infrastructure is one which has at its centre, information content and the skills necessary for its use. This core is dependent on the provision of enabling technologies and facilities (such as computer systems and access networks, buildings). At the apex are the products which are derivable from the content – knowledge and innovation. Linking of the three

components of the model (figure 1) is the professional expertise of researchers, technical staff, librarians, IT professionals and other staff.

5.5 There are five main interactions which are fundamental to effective information infrastructure provision:

- **discovery** - provision of mechanisms (such as portals, gateways and metadata repositories) to facilitate access, and skills to locate and analyse data and information
- **access** - to existing information resources, irrespective of physical format, which have been arranged in some logical manner– this includes print publications, video, sound recordings, images (such as photographs, paintings), maps, databases, digital publications
- **creation** - of new resources including publications, databases and repositories of non-bibliographic information
- **management** – of access to information resources and the protection of associated intellectual and copyright rights including authentication, authorisation and digital rights management systems as well as tools developed for the organisation and retrieval of data
- **dissemination** - to make available newly created resources including the development of non-traditional scholarly communication mechanisms

5.6 The model (figure 1) shows the interrealition of the technology, facilities, services and people which will enable the Australian higher education sector to develop, maintain and use a research information infrastructure which meets international good practice. Irrespective of their institutional affiliations, geographical location or academic discipline, members of the Australian higher education community should have access to information infrastructure resources which optimise the research activities of their institutions.

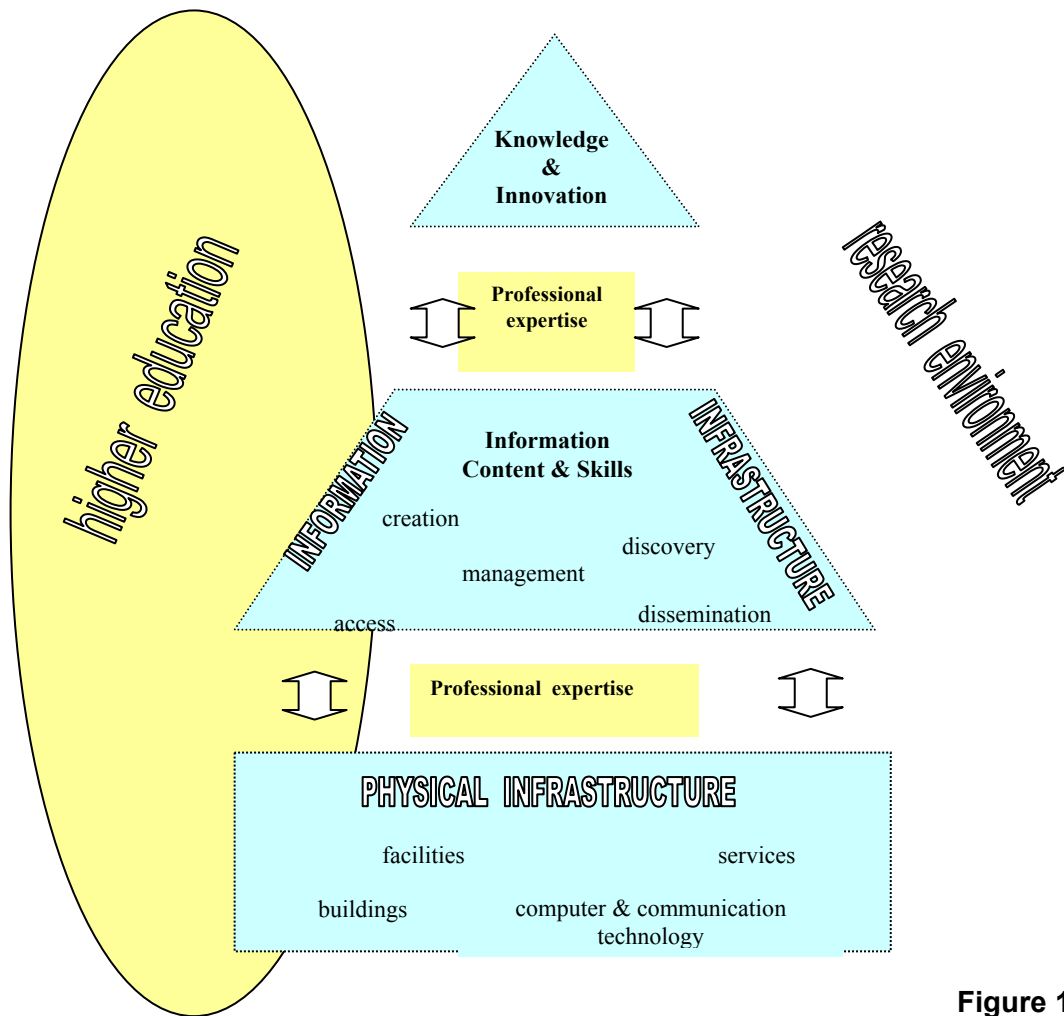


Figure 1

5.7 There are no immutable boundaries affecting the use of the information and technical infrastructures. Investment in those elements of the infrastructure which support research may also benefit teaching, learning, governance and administration. In the information infrastructure, content created through the research process will support further research and may underpin teaching. Without this content, the technical infrastructure has no substantive purpose.

5.8 The interaction between the creation, management, access, discovery and dissemination of information is ubiquitous. The creation of an information resource must take account of management, access and discovery issues if the resource is to be disseminated and used effectively.

6.0 ISSUES

6.1 As a consequence of consultation with key stakeholders in Australia and investigation of information infrastructure provision internationally, many issues were identified including:

- Australia has the potential to develop a common national information infrastructure for higher education
- the information infrastructure required to support research is also applicable to teaching and learning
- institutions have varying needs for elements of the information infrastructure depending on the profile of their research, teaching and learning activities
- projects which are characterised as 'teaching and learning' have difficulty identifying appropriate funding sources
- Australian investment in the information infrastructure lags behind investment in the UK, Canada, Singapore, USA and parts of Western Europe
- Australian universities are acquiring a diminishing percentage of scholarly publications at a time when the body of knowledge is rapidly increasing
- research requires access to a wide range of data resources not just those traditionally collected by libraries
- scholars, particularly in the Humanities and Social Sciences, experience difficulty finding publishers for works, especially monographs, which have academic value but may not have commercial value
- heavy dependence on a small number of commercial publishers has had a deleterious effect on library budgets and on the dissemination of research results
- dissemination of Australian research needs to be promoted using new technologies and the adoption of international standards and protocols including metadata and digital rights management
- while there is significant and cost-effective collaboration among university libraries, further opportunities are available but require seed funding
- investment in the information infrastructure must be ongoing and strategic
- continuing oversight of the development of the national information infrastructure is required by key stakeholders
- the national infrastructure needs to be able to meet the diverse requirements of individual scholars as well as institutions.

6.2 A fundamental issue is the economics underpinning the creation and dissemination of scholarly information. Although there remains considerable publishing by academic societies, a significant number of refereed journals are owned by or contracted to, relatively few commercial publishers. The majority of these corporations have funded all of their transition to digital publishing by annual subscription increases. While stockholder returns have been preserved, there have been profound effects on their customers – the international academic community. The publishers' strategy has highlighted the lack of control exercised by the academic community over a production process which depends on their intellectual effort, is heavily subsidised by individuals and their institutions, and whose end product is almost entirely acquired by the community which provides the raw material.

6.3 The innate conservatism of publishers has strained relations further. Despite having moved to digital production methods, and increasingly using computer and communication technologies for distribution, publishers have been unable or unwilling to adopt new pricing structures. They remain attached to pricing models and access conditions relevant to the print environment but unsuitable to the flexibility provided by communication technologies.

6.4 Technology provides the academic community with opportunities to reclaim significant control over all aspects of the publication process. This will not obviate the need for the services provided by publishers – editing, quality control, marketing,

distribution – but there are other ways of achieving them. Alternative models have been developed by SPARC (Scholarly Publishing and Academic Resources Coalition) which have led to the publication of new electronic journals which are challenging the long held hegemony of several commercial publications. E-print repositories based on open source architecture are also emerging.

6.5 Ventures such as SPARC are only part of the future solution. Providing the academic community with the infrastructure necessary to create, discover, access, manage and disseminate is, and will continue to rely on, a diverse partnership of investment by individual scholars, institutions, government and private enterprise.

6.6 The extent to which members of the academic community control, influence and own scholarly communication must be addressed. Technology is available to implement new structures and processes but the opportunity must be taken quickly to prevent inappropriate ownership of the agenda by entities interested only in profit. Innovative approaches require modelling and testing.

6.7 No single institution can make sufficient impact to effect pervasive change in the present scholarly communication environment. Even concerted action by all of a nation's universities is unlikely to have significant effect as the issues require international collaboration. Effective solutions also require investment in technology, people and processes which often needs the intervention of non-university agencies for funding and coordination.

6.8 In the United States, charitable educational trusts and agencies, such as the National Humanities Foundation and the National Science Foundation, have played a role. British efforts have been backed significantly by government through the Joint Information Systems Committee. While Australia has had access to government funding for research information infrastructure, it has come from multiple sources without much regard to systemic needs.

6.9 Australian scholars, the Academies, learned and professional societies, universities and other research institutions cannot expect to influence change in scholarly communication unless they collaborate nationally and internationally and unless they have tangible and ongoing support through government funding. The academic community must also identify and prioritise its needs to make best use of available resources.

7.0 INFRASTRUCTURE GAPS

7.1 The Information Infrastructure Advisory Committee was required to report within four months of its establishment. It was recognised that this schedule would not permit extensive investigation of all issues especially an exhaustive study of infrastructure gaps and remedial strategies. Attention was concentrated on reviewing international initiatives, limited stakeholder consultation and reconsideration of national issues raised by bodies such as the National Scholarly Communications Forum (NSCF) and the Coalition for Innovation in Scholarly Communication (CISC).

7.2 The Committee was mindful of the benefit of ongoing monitoring of the information infrastructure requirements of the research community and for constant investment to ensure that these needs can be met. The quality of Australian research, especially that undertaken by early career researchers, depends on access

to and effective use of a robust information infrastructure which has as few institutional-related barriers as possible.

7.3 The major gaps identified involve:

- provision of mechanisms and skills which improve the ability of individuals to find, access, use and create information resources
- creation of repositories of Australian research
- improved access to Australian information resources including the digitisation of material
- provision of access to information resources not currently available to Australian researchers
- skills development for researchers to enable them to access and utilize complex information resources effectively
- cost-effective access to the research information infrastructure
- investment in information dissemination technologies
- development of software and systems to control access to digital publications and repositories and to protect intellectual property

8.0 STRATEGIC CONSIDERATIONS

8.1 A number of issues influenced the deliberations and resolutions of the Advisory Committee. These included:

- nature of the existing research information infrastructure
- past projects and initiatives
- international developments and trends
- Systemic Infrastructure Initiative guidelines
- stakeholder consultation

8.2 The existing research information infrastructure is the result of a mix of factors including planned investment, technological aggregation, experimentation, commercial interest and sheer serendipity. Past development of the information infrastructure has been largely 'library' and institutionally based rather than related to national needs or strategies.

8.3 For at least the past two decades, librarians have sought to make their collections more readily available and to collaborate to avoid unnecessary duplication. These efforts have taken account of appropriate international standards and Australian librarians have contributed to their development and refinement. The use of standards by Australian libraries to achieve effective national systems is regarded internationally as good practice.

8.4 National and international collaboration has enabled Australian university libraries to provide a comparable range and quality of services to those that exist in peer countries and to do so with lower resource levels. While past efforts have used available technologies to the best advantage, much of this use has been guided by print-based concepts. Most libraries make effective use of Web technology to provide better access to information resources. This improves the support provided to research as well as to teaching and learning. These initiatives need to be optimised so that the information infrastructure meets the needs of current scholars and provides Australia with advantages well into the future.

8.5 The deliberations of the Information Infrastructure Advisory Committee were influenced by this imperative. The Committee was constrained, however, by the requirement that Systemic Infrastructure Initiative funding be used only to support research and research training. A further limitation was imposed by Systemic Infrastructure Initiative funding being available for project activities and not for ongoing operational expenses. Many universities are struggling to maintain current operations, especially library journal subscriptions. They have little capacity for supporting initiatives which may take some years to yield tangible benefit.

8.6 Since 1991, more than \$32 million has been allocated from various funding sources for projects associated with the information infrastructure (Appendix B). A number of these projects claimed to have long-term benefit and viability but ceased to continue once the project funding ended. Others involved in the application of new approaches or the establishment of new services which have had lasting value. The sustainability of each project should be a key consideration affecting the allocation of future funding.

8.7 In considering initiatives which might be recommended for support, the Committee took account of the potential for:

- benefit to the support of research activities or to research training
- sector-wide benefits by expanding access to shared facilities
- commitment by the majority of universities including financial contribution
- providing a strategic advantage to Australian research
- sustainability beyond project funding

The Committee developed a further set of criteria against which to evaluate specific project proposals (Appendix C).

8.8 During the course of its work, the Committee was made aware of a number of issues and projects which related to the teaching and learning environment or to the administration of universities. Although these issues were clearly related to information infrastructure, they could not be considered in any depth as the Committee's remit was limited to research issues.

8.9 The interrelation of infrastructure elements suggests that there needs to be a forum in which strategic issues relating to the entire information infrastructure can be considered. Accompanying such a forum is a need for a funding mechanism which can support initiatives across the broad spectrum of higher education issues.

9.0 PRIORITY AREAS - 2003

9.1 The Committee was requested to recommend areas which might be funded from the Systemic Infrastructure Initiative in 2002 and which would improve support for research and/or research training. Consideration was given to the identification of priority projects which would strengthen support for the research infrastructure in one or more of the following strategic areas:

- **Discovery and management of research information**
- **Access to research information resources**
- **Creation and dissemination of Australian research information**

9.2 The priority projects identified are not exhaustive and the Committee recognised that there are other projects and priorities which remain unaddressed and

to which consideration must be given in the future. The Committee was mindful, however, of the Minister's requirement that the projects have 'achievable outcomes' which can be funded from the Systemic Infrastructure Initiative and which relate to the research information infrastructure. The priority projects identified in Appendices D – O are the result of careful consideration by the Committee

9.3 The priority projects detailed in Appendices D to O are the result of careful consideration by the Committee. As a consequence of consultation with the user community, a large number of potential projects was identified and prioritised by the Committee. The majority of these projects had the potential to provide systemic benefit to Australian research. The Committee elected to recommend only those projects which had the capacity to provide the greatest benefits to the Higher Education sector and which were achievable within a 12 to 24 month time frame.

9.4 The Committee considered the feasibility of assigning funding priorities to each of the projects. This proved difficult as the recommended projects do not exist in isolation from one another. They constitute an integrated package of initiatives intended to improve the resources available to Australian researchers at a systemic level. The successful implementation of the identified projects, and future support for related initiatives, will provide researchers with an information infrastructure comparable to that available to their peers internationally.

9.5 DISCOVERY AND MANAGEMENT OF RESEARCH INFORMATION PROGRAMME

9.5.1 Considerable investment is devoted to the creation and acquisition of information resources for use by the academic community. Yet, there is little empirical knowledge about how effectively these resources are used. Anecdotal evidence, however, suggests that many individuals experience difficulty locating and then gaining access to the text, or object, needed for their scholarship.

9.5.2 For centuries the collections amassed in libraries, archives and museums were recognised as the repositories of recorded knowledge. Custodians of these collections sought to facilitate access by the creation of lists, catalogues and other finding aids. The efficiency of these tools was improved by the application of technologies commencing with the printing press. The provision of union catalogues and the use of standards such as MARC and Z39.50 have facilitated the discovery of information for which bibliographic records have been created but they are no longer adequate on their own.

9.5.3 With the advent of the Internet and Web, discovery of information has become both easier and more difficult. The ease with which information can be made available and the growing sophistication of Web browsers has encouraged self-publication by individuals and organisations previously excluded from the formal publishing process. This has resulted in an increase in the amount of information available as well as the complexity of finding it. At the same time, locating reliable and authenticated information sources has been accompanied by greater uncertainty.

9.5.4 To address some of these issues, universities have sought to find ways to simplify the discovery of information by their staff and students. Mechanisms have included:

- links from library catalogues to quality evaluated Web sites
- development of gateways which aggregate links to sites relevant to distinct subject, discipline or format sites

- creation of portals which allow users to tailor their access to resources which meet their individual needs
- development of tuition programmes for information literacy skills initially at undergraduate level but there is an increasing number of programmes aimed at staff and postgraduate students
- purchase and networking of disciplinary databases.

9.5.5 Despite these initiatives, users continue to experience difficulties finding information resources which are relevant to their needs. Many scholars rely on Web search engines and browsers to find information but these mechanisms produce large numbers of results many of which are often unrelated to the requester's topic. There is also no guarantee of the authenticity or quality of the data retrieved. There are also vast amounts of data available on the Web which are inaccessible.

9.5.6 To function effectively, users of the Web need skills which enable them to utilise their time to best advantage and to determine the relevance, quality and provenance of search results. Some of these skills are similar to those utilised by scholars for centuries but some require the acquisition of new knowledge. Many scholars have not acquired the new generation of research skills and may be disadvantaged in their scholarship, application for grants and the quality of their research.

9.5.7 The Advisory Committee identified three areas of strategic importance relating to the discovery and management of research information:

a. Resource Discovery Mechanism (Appendix D)

This project will improve access to a range of pre-selected electronic resources including subject gateways hosted by universities, government departments and statutory agencies. A resource discovery mechanism has potential to include Australian and international sites. Although future developments in Web technology will improve the ability to search automatically across a range of Web-based electronic resources, it is likely that a resource discovery mechanism of this kind will be required for some years.

b. Subject Gateways (Appendix E)

Subject gateways have been developed by a number of Australian universities and function at varying levels of success. The main difficulty is their sustainability in a very dynamic Web environment. A reconceptualisation of their role is timely and would complement work being undertaken internationally by groups such as the W3C Semantic Web and provide information for future gateway project funding proposals.

c. Research Skills (Appendix F)

The acquisition and development of research skills is assumed to be part of the research training process with knowledge passed from supervisor to student. The effectiveness of this process has been strained by a growing dependency on digital information resources. Researchers at all stages of their careers need to possess skills which enable them to locate, analyse and disseminate information in a digital environment.

9.6 ACCESS TO RESEARCH INFORMATION RESOURCES PROGRAMME

9.6.1 The acquisition and effective management of information resources are essential to research. Traditionally, each university library attempted to develop an independent access, use and delivery infrastructure. This has never been totally achievable in Australia and collaborative mechanisms have grown steadily for almost fifty years. Recently, collaboration has increased due to a mix of factors including

growth in the volume of scholarly publishing, emergence of new information and communication technologies, and the inability of any single institution to fund all of its information needs especially for research.

9.6.2 Researchers have access to the libraries of all Australian universities and in this sense, a 'single library' exists. Collaboration among libraries is limited by factors such as institutional competition and the pricing structures used by publishers. Greater investment at a systemic level has the potential to encourage further sharing of facilities and services especially those which are based heavily on the use of information and communication technologies.

9.6.3 For some years, the Council of Australian University Librarians has coordinated the evaluation of digital information resources and the negotiation of consortium purchase arrangements. Each product is assessed and negotiated individually and institutions determine whether to participate in the purchasing consortium. The CAUL model allows institutions the flexibility of determining which product consortia they will join depending on the relevance of the product to their research, teaching and learning programmes as well as their ability to meet ongoing costs.

9.6.4 There are currently 49 products in the scheme with an average of 20 institutions participating in each consortium. Participants include all Australian and New Zealand universities, CSIRO and a number of other government funded agencies. By purchasing as part of a consortium, institutions are able to acquire resources at a lower overall cost than by unilateral negotiation. This particularly benefits smaller institutions which may have less bargaining power.

9.6.5 The Committee considered the feasibility of funding a national site licence approach which would provide the same information resources to all universities. Previous initiatives of this kind have been unsuccessful as there are few products which are required by all institutions and not all institutions have the capacity to pay ongoing subscriptions.

9.6.6 Internationally, the site licence approach has been successful in Britain, Scandinavia, Canada and some regions of the US. These initiatives, however, have required significant recurrent central funding, often radical adjustment to library budgets and agreement by institutions to collaborate and contribute financially even if institutional priorities are not always satisfied.

9.6.7 A more systematic application of the Systemic Infrastructure Initiative would provide institutions with the leverage necessary to develop joint services and facilities which would:

- save individual universities some investment costs associated with physical facilities
- lessen institutional dependence on the skills and knowledge of key individuals
- create services which are capable of providing support beyond higher education
- be part of an international resource network
- foster collaboration.

9.6.8 The Advisory Committee identified four areas of strategic importance relating to access to research information resources:

a. Humanities and Social Sciences Resources (Appendix G)

To date, much of the digital publishing of scholarly literature has been in disciplines related to the sciences, technology and medicine. Consequently, libraries have

tended to invest in these services. It is not possible to use Systemic Infrastructure funding to support ongoing subscriptions although funding can be used for one-off payments for backsets. There are several products available but consultation with stakeholders indicated a high preference for the acquisition of JSTOR. This is an initiative of a group of research libraries in North America which has digitised 242 journals in arts, sciences and business. Acquisition would improve the resources of those universities which currently do not hold the journals. Those universities which have print copies of the journals may relegate them to storage and utilise the freed space for other priorities. The ongoing subscription to JSTOR is relatively modest and within the reach of most universities. The purchase of JSTOR could include negotiation for Australian journals to be included as part of the standard product.

b. Refereed Journal Literature (Appendix H)

The research process relies heavily on the use of refereed journal publications and all universities strive to provide access to as many relevant titles as possible. Subscriptions to these publications tend to be expensive and they are often initial targets for cancellation. It is not possible to use the Systemic Infrastructure Initiative to support ongoing subscriptions although funding can be used for one-off payments for backsets. Of the options available for purchase, the *Web of Science* produced by the Institute for Scientific Information was identified as a priority. This is a high quality research resource which supports most research areas in addition to science and has been acquired by 28 universities. Annual subscriptions and backfiles are expensive and most universities have been able to acquire only a five year backfile. This is insufficient to support research needs. Acquisition of a further five year backfile for all current subscribers would improve support for research in 75% of Australian universities.

c. Non-Bibliographic Digital Data (Appendix I)

Many researchers depend on data not available in print or published formats. This includes geospatial, demographic and astronomical data, images and sound resources. Much of this data is applicable to a limited number of researchers or research activities, and requires specialised storage and retrieval facilities. In the past, access to this data has been funded through individual research initiatives or as a project by an ARC infrastructure grant. Further investigation is required to identify the nature and extent of non-bibliographical digital data which might be provided as a national resource.

Support is also required to develop mechanisms which will improve access to data collected as part of individual research projects. Some of this data has wider applicability but is inaccessible. It might be part of a national resource, in conjunction with any plans for the provision of a 'digital library' resource in the second phase of the Australian Partnership for Advanced Computing (APAC) initiative.

d. Collaborative Storage Facilities for Research Publications (Appendix J)

Many institutions have constraints on capital funding and need to re-purpose existing space in order to accommodate new services. The acquisition of digital publications provides opportunities for some print materials, especially journals, to be relegated to storage and maintained as a national archive. Collaborative storage facilities have already proven their efficiency in South Australia and Victoria as a means of institutions reducing their need for costly on-campus storage space. Further capacity is required to provide a national service and to allow for more extensive relegation and the better use of resources.

9.7 CREATION AND DISSEMINATION OF AUSTRALIAN RESEARCH INFORMATION PROGRAMME

9.7.1 University staff throughout the world make a significant contribution to the creation and organisation of scholarly information. Their efforts are underwritten largely by a varying mix of their employing institutions, research sponsors and personal resources. The results of this labour are usually provided without charge to publishers. This transaction is often accompanied by a transfer of intellectual property rights to the publisher as a precondition of the work being published.

9.7.2 Publishers are an indispensable part of the scholarly communication environment and they provide a range of services associated with the authentication and dissemination of scholarly works. Important aspects of the publisher's role are the provision of capital to fund the publication process pending the receipt of revenue, and accepting the risks involved in any commercial enterprise. Yet a great part of their endeavour is provided free of charge, or at greatly subsidised rates, by scholars who undertake reviewing, refereeing and editorial tasks.

9.7.3 The nexus between publishers and the academic world has provided mutual benefits over many decades. In part this has been due to the influence which academe was able to exert on individual publishers and in part to the ability of universities to increase their expenditure on library resources especially those produced by a small number of scientific and technical journal publishers.

9.7.4 The increasing ownership of scholarly publishing companies by a few large international enterprises has resulted in a change in the relationship between these publishers and the academic community. Like most other commercial undertakings, these conglomerates have a duty to maximise returns to their shareholders. To maintain their net earnings, some publishers have increased the price of their products at rates well beyond annual consumer price index changes and substantially above growth in university income.

9.7.5 The development of an overall strategy is required to improve access to Australian research by supplementing existing publishing mechanisms and taking advantage of emerging technologies. An important aspect of this strategy is the provision of effective means of controlling access to and use of intellectual property. Underlying these projects is a need to adhere to international standards in areas such as metadata, and to use the Open Archive Initiative protocols:

9.7.6 The Advisory Committee has identified six areas of strategic importance relating to the Creation and Dissemination of Australian research information:

a. E-print Repositories (Appendix K)

There has been considerable action internationally to use the Open Archive protocols for the establishment of e-print repositories. These facilities provide a means of preserving the intellectual output of the nation in a manner which is readily retrievable, adheres to international standards and is distinct from the restraints of commercial publishing.

b. Digital Theses (Appendix L)

The Australian Digital Theses Program has been operational for some years and is recognised internationally for its effectiveness as a collaborative model. There is recognition of the need for a retrospective online index to Australian theses. A union list was published by the University of Tasmania until 1991 after which most universities included theses in the national bibliographic database (Kinetica). These

records are not easily searchable by discipline which limits access by researchers and by potential postgraduate students.

c. Electronic Publishing (Appendix M)

The development of electronic university presses has the potential to give institutions the ability to provide scholars with opportunities to publish works which are of high academic worth but low commercial value. This particularly affects scholars in the humanities and social sciences. The complexity of issues associated with establishing a press suggests that there is scope for a collaborative approach to at least specifying the infrastructure requirements if not creating a distributed Australian Universities Press.

d. Management of Access to Digital Resources (Appendix N)

There is a growing need for efficient and reliable means of authenticating and authorising the access of individuals to digital information resources. This need applies to those resources purchased or licenced from commercial suppliers as well as to those created within individual universities.

e. Australian Publications and Manuscripts (Appendix O)

A significant number of scholars use Australian materials in their research. Much of this material is available only in print or manuscript format and is unlikely to be digitised other than in a piecemeal fashion. Key areas for digitisation might include Australian journals, selected government publications and seminal monographs no longer in print.

f. Future of Scholarly Publication

While recognising the need to raise the awareness of Australian researchers to changes in the dissemination of knowledge, the Advisory Committee considered it outside the parameters of the Systemic Infrastructure Initiative. The Committee was supportive of the efforts of the National Scholarly Communications Forum and recommended that a seminar of key stakeholders be held in 2003. This seminar might concentrate on developments in monograph publication and the effects they will have on research and scholarly publishing.

10.0 OUTCOMES AND RECOMMENDATIONS

10.1 The three programmes identified by the Advisory Committee encompass the systemic information infrastructure needs expressed by stakeholders. The projects which form part of each programme do not exist in isolation of one another. They constitute an integrated package of initiatives intended to improve the resources available to Australian researchers at a systemic level. The successful implementation of the identified projects, and future support for related initiatives, will provide researchers with an information infrastructure comparable to that available to their peers internationally.

10.2 If all of the recommended projects are funded and implemented as recommended, and they deliver the desired outcomes, the Australian higher education research community will have:

- a. more systemic and systematic method of identifying and funding information infrastructure development
- b. closer links with international bodies involved in similar projects
- c. a stronger systemic information infrastructure supporting research and research training
- d. greater collaboration among universities and stakeholder groups

10.3 These facilities will also have wider application within the Australian research community and some projects will have benefits for other sections of the higher education environment, particularly for teaching and learning.

10.4 The completion of the projects recommended by the Information Infrastructure Advisory Committee will not meet all of the needs of Australian researchers. There will remain a need to fund projects which meet the requirements of specific research projects. Some of these needs may be met from ARC or individual institutional infrastructure funding.

10.5 Continued assessment of the systemic information infrastructure supporting research will need to be undertaken and priorities funded. This is a process which needs support funding. This investment is repaid by better decision-making and by the development on the part of stakeholders of a 'good of the system' approach which contributes to an infrastructure which is needs driven.

10.6 **Recommendations**

The Information Infrastructure Advisory Committee recommends that:

1. funding for the priorities identified in Appendices D to O of this report be allocated from the Systemic Infrastructure Initiative to allow implementation commencing in 2003
2. institutional contributions to the projects be limited to their obligation to sustain the projects after Systemic Infrastructure Initiative funding has been utilised
3. expressions of interest be sought from consortia, with lead universities listed in Schedule 1 of the *Higher Education Funding Act 1988*, to achieve the objectives listed for each project. Where more than one bid is submitted for an expression of interest, potential consortia be required to consult with the aim of forming a single consortium
4. multiple projects designed to deliver similar outcomes not be funded
5. an Information Infrastructure Projects Management Committee have oversight of funded projects and their evaluation
6. a secretariat be funded to oversee the implementation of Information Infrastructure programmes including liaison with other funding bodies and support for the Advisory Committee
7. consideration be given to the establishment of a body to advise on the wider strategic implications for the Australian higher education sector of changes in scholarly information and its infrastructure needs to support teaching, learning and research.

APPENDIX A**ADVISORY COMMITTEE****Background**

The Information Infrastructure Advisory Committee was established by the Minister for Education, Science and Training in April 2002.

The basis of the Committee's investigations was a discussion paper - *Information Infrastructure Development for Australian Higher Education* - prepared for the Minister. This paper was based on work undertaken by the Council of Australian University Librarians, National Scholarly Communications Forum, National Library and the Coalition for Innovation in Scholarly Communication. Account was taken also of international activities notably those of the Joint Information Services Committee (JISC) in the United Kingdom, Coalition for Networked Information and the Scholarly Publishing and Academic Resources Coalition in North America, the Canadian Innovation Strategy and the International Scholarly Communication Alliance.

Meetings of the Committee were held on 5 June, 28 August and 10 October 2002. The papers and minutes of Committee meetings were distributed widely and comment sought. In addition, discussions were conducted with key stakeholders throughout the country.

Terms of Reference

Advise the Government on the information infrastructure needs of the higher education sector.

The Committee will devise a programme of work and conduct a consultative process of key stakeholders to identify and analyse gaps in information infrastructure and provide advice to the Minister for Education, Science and Training on priorities, and their cost, for funding for the 2002 round of the Systemic Infrastructure Initiative. The focus of the advice provided to Government will be on achievable outcomes and may draw upon work already undertaken by various groups.

The Committee will act as an expert group rather than a representative group and will consist of:

- A Chair and
- Members comprising an expert nominated from each of the following:
 - Council of Australian University Directors of Information technology
 - Council of Australian University Librarians
 - National Library of Australia
 - CSIRO
 - Australian Research Council
 - NCODE-FLA
 - IMS Australia
 - Australian Academy of the Humanities
 - Australian Vice-Chancellors' Committee; and
 - Department of Education, Science and Training

The Chair and Members will be invited by the Minister for Education, Science and Training to participate on the Committee for the duration of the Committee's tenure.

A small secretariat may be established by the Chair, in order to assist the Chair to manage meetings and conduct minor research.

The Commonwealth Government under the Systemic Infrastructure Initiative will provide a small amount of funding for the Committee. Funding will be provided to a university listed in Schedule 1 of the *Higher Education Funding Act 1988* to manage the process. Funding is to be used to maintain and manage the Secretariat, and costs incurred by the Chair. Members of the Committee will be expected to meet their own costs.

The Committee will come into being from the date of their invitation from the Minister to participate on the Committee and conclude on 31 September 2002.

Membership

Chair

Mr John Shipp, University of Sydney

Australian Academy of the Humanities

Professor Malcolm Gillies

Australian Research Council

Professor Lawrence Cram

Australian Vice-Chancellors' Committee

Professor Christine Ewan

Professor Patrick Garnett

Council of Australian University Directors of Information Technology

Mr Geoffrey Dengate

Council of Australian University Librarians

Ms Helen Hayes

CSIRO

Mr Phillip Kent

IMS Australia

Professor Neil McLean

Department of Education, Science and Training

Dr Evan Arthur

Ms Margot Bell

National Library of Australia

Mr David Toll

NCODE-FLA

Professor David Rich

Notes

1. The Committee membership was amended prior to the first meeting to include an expert nominated by NCODE-FLA and to include a second nominee of the Australian Vice-Chancellors' Committee

2. Professor Ron Macdonald was nominated as an observer on behalf of the Higher Education Bandwidth Advisory Committee and of the AVCC Deputy and Pro-Vice-Chancellors (Research) Committee from September 2002.
3. Professor Neil McLean resigned from the Committee in September for personal reasons.
4. The term of the Committee was extended to 30 October 2002 to parallel the term of the Higher Education Bandwidth Advisory Committee.
5. The University of Sydney was provided with funding to provide secretariat support for the Committee and to manage the stakeholder consultation process.

APPENDIX B

INFORMATION INFRASTRUCTURE RELATED PROJECTS FUNDED

1991 – 2001 BY

- ARC Australian Research Council
- CDP Capital Development Pool
- EIP Evaluations and Investigations Programme
- HEIP Higher Education Innovation Programme
- SII Systemic Infrastructure Initiative

| Project Title | Amount | Institution | Year | Fund Source |
|--|---------|-------------|---------|-------------|
| CAVAL Information Delivery and Electronic Requesting | 200,000 | ACU | 1997 | ARC |
| Co-operative Library Project | 53,000 | ADELAIDE | 1992 | HEIP |
| European Microfilm set | 350,000 | ADELAIDE | 1998 | ARC |
| European Microform Sets: increasing their access and utility by analytic cataloguing | 140,000 | ADELAIDE | 1999 | ARC |
| Music Records Conversion Project | 100,000 | ADELAIDE | 1993 | ARC |
| Library Services: National Bibliographical Database - for the Development of Maritime Serials | 3,000 | AMC | 1993 | HEIP |
| Access to Distributed National Collections: Models for Future Development for Integrated Print/Electronic Delivery to Australian Higher Education Institutions | 63,000 | ANU | 1995 | EIP |
| Australian Key Journal Project | 100,000 | ANU | 1999 | ARC |
| Australia's Information Future | 20,000 | ANU | 1999 | EIP |
| Co-operative Library Project | 107,000 | ANU | 1992 | HEIP |
| Establishment of On-Line Links Between Australian Universities & the Nikkei Database in Japan 1993 - Extension of On-Line Links | 200,000 | ANU | 1992-93 | ARC |
| Instructional Management System (IMS) | 239,045 | ANU | 1998 | HEIP |
| Library Services: National Bibliographical Database - for the Development of Chinese/Japanese and Science Serials | 46,000 | ANU | 1993 | HEIP |

| | | | | |
|--|---------------|--------------------|---------------|--------------------|
| The Australian Key Journals Project: increasing access to Australian research information | 265,000 | ANU | 1996 | ARC |
| The Australian Nationally Shared Chinese, Japanese and Korean Languages Automated Library System | 460,000 | ANU | 1993-94 | ARC |
| The Development of a National Networked Facility for Research in Australian Music | 265,000 | ANU | 1996 | ARC |
| Development of Infrastructure in University Libraries | 2,090,000 | AVCC | 1995 | HEIP |
| Development of Infrastructure in University Libraries | 1,410,000 | AVCC | 1996 | HEIP |
| Library Infrastructure | 1,500,000 | AVCC | 1994 | HEIP |
| Linking University Library System (via UNSW) | 256,000 | AVCC | 1991-92, 1999 | ARC |
| Management of access to networked information resources | 101,000 | CAUL | 1993 | ARC |
| Management of Access to returned information | 170,000 | CAUL | 1999 | ARC |
| An On-Line Information Network | 65,000 | CSU | 1996 | ARC |
| Co-operative Library Project | 23,000 | CSU | 1992 | HEIP |
| Library Services: National Bibliographical Database of Online Serials | 15,000 | CSU | 1993 | HEIP |
| Regional Geographic Information System | 200,000 | CSU | 1992-93 | ARC |
| Project Title | Amount | Institution | Year | Fund Source |
| Internationalising South Asian scholarly data | 100,000 | CURTIN | 2001 | ARC |
| South East Asia renovating the National collection | 200,000 | CURTIN | 1997-98 | ARC |
| Technology Base for Postgraduate Aboriginal Community Research Network | 100,000 | CURTIN | 1997 | ARC |
| Co-operative Library Project | 25,000 | DEAKIN | 1992 | HEIP |
| The Australian Citizenship Data Base Network | 110,000 | DEAKIN | 1996 | ARC |
| Shared Client Authentication Project | 1,062,000 | ECU | 2001 | CDP |
| Western Australian University Libraries | 431,000 | ECU | 1999 | CDP |

Electronic Network

| | | | | |
|---|-----------|----------|---------|------|
| National Electronic Facility to Promote Research into Australian Performing Arts | 140,000 | FLINDERS | 2000 | ARC |
| Brisbane Region Asian Studies Library Collection | 174,000 | GRIFFITH | 1991 | ARC |
| Chinese/Japanese/Korean Library System Joint Project | 180,000 | GRIFFITH | 1992 | ARC |
| Library Services: National Bibliographical Database - for the Development of Music Holdings Survey | 5,000 | GRIFFITH | 1993 | HEIP |
| National distributed facility for logic and constraint based software tools | 100,000 | GRIFFITH | 2000 | ARC |
| Regional Linking of University Library Systems | 130,000 | GRIFFITH | 1992 | ARC |
| Spatial Information Infrastructure for Asian Studies in Australia 1994 - Continuation, Extension & Expansion 1995 - Historical Developments & Environmental Changes | 1,213,000 | GRIFFITH | 1992-96 | ARC |
| Spatial Information Infrastructure for Russian & Central Euro-Asian Studies in Australia (SIIRCEASA) 1995 - Continuation and Elaboration | 230,000 | GRIFFITH | 1994-95 | ARC |
| Argus on-Line: A Nineteenth Century Australian Newspaper Digital Index | 200,000 | LA TROBE | 2002 | ARC |
| Australian Chinese Newspaper Web-based Index Project | 100,000 | LA TROBE | 2000 | ARC |
| Australian Research Library Network | 2,081,000 | LA TROBE | 2002 | SII |
| Australian Research Library Network (AARLIN) for resource sharing | 250,000 | LA TROBE | 2001 | ARC |
| Library Serials Management Information System | 50,800 | LA TROBE | 2000 | HEIP |
| Library Services: National Bibliographical Database - for the Development of European/Latin American Serials | 50,000 | LA TROBE | 1993 | HEIP |
| South Asia - Renovating the National Collection | 100,000 | LA TROBE | 1997 | ARC |

| | | | | |
|--|---------------|--------------------|-------------|--------------------|
| Australian National Speech Database Initiative 1993 | 736,000 | MACQUARIE | 1991-95 | ARC |
| Australian National Database of Spoken Language | | | | |
| Collaborative Project to Link all NSW University Libraries | 260,000 | MACQUARIE | 1991 | HEIP |
| Digital Rights Management in the Higher Education Sector | 74,773 | MACQUARIE | 2001 | EIP |
| IMS Australia - Collaborative On-line Learning and Information Services - Testbed | 500,000 | MACQUARIE | 2002 | SII |
| IMS Australia - Core Funding | 544,475 | MACQUARIE | 2002 | SII |
| IMS Support and Working Groups Participation Project | 139,470 | MACQUARIE | 2001 | HEIP |
| Agrigate Internet Gateways | 155,000 | MELBOURNE | 1998-99 | ARC |
| Project Title | Amount | Institution | Year | Fund Source |
| Australian National Network Scientific annual activities | 120,000 | MELBOURNE | 1999 | ARC |
| Australian Sciences Archives Project | 280,000 | MELBOURNE | 1992-94 | ARC |
| Australian trade union heritage resources gateway | 100,000 | MELBOURNE | 2001 | ARC |
| Consolidation of National Soviet & East European Studies Library Resource Base 1993 | 360,000 | MELBOURNE | 1992-94 | ARC |
| Co-operative Library Project | 108,000 | MELBOURNE | 1992 | HEIP |
| Distributed national network for the scientific analysis of artworks | 155,000 | MELBOURNE | 1998-99 | ARC |
| Household Research Database Facility | 130,000 | MELBOURNE | 1998 | ARC |
| International and Comparative Fiscal Research Facility | 100,000 | MELBOURNE | 1999 | ARC |
| International Economic and Social Unit-Record Database (IESUD) | 120,000 | MELBOURNE | 2000 | ARC |
| Library Services: National Bibliographical Database - for the Development of Russian Serials | 10,000 | MELBOURNE | 1993 | HEIP |
| National Social Science Survey (NSSS) Research | 120,000 | MELBOURNE | 1999 | ARC |

Data Base Facility

| | | | | |
|--|---------|------------|---------|------|
| Spatially Referenced Digital Images | 359,000 | MELBOURNE | 1993-94 | ARC |
| Australia's Book Heritage Resources (Early Imprints Project) | 450,000 | MONASH | 1992-93 | ARC |
| Bibliography of Australian Literature and Australia's Literary Heritage: A national bibliographic data bank | 437,000 | MONASH | 1993-99 | ARC |
| Library collection for Korean Studies | 140,000 | MONASH | 1994 | ARC |
| Library Collection for National Korean Studies Centre 1994 - Research Library & Database for National Korean Studies Centre's Korea 2000 Research Programs | 290,000 | MONASH | 1992-94 | ARC |
| Library Services: National Bibliographical Database - for the Development of Physical Science/Engineering and Indonesian Serials | 25,000 | MONASH | 1993 | HEIP |
| Monash Indigenous Research Infrastructure Facility | 102,000 | MONASH | 2000 | ARC |
| Co-operative Library Project | 15,600 | MURDOCH | 1992 | HEIP |
| Library Services: National Bibliographical Database of Asian and Veterinary Serials | 5,000 | MURDOCH | 1993 | HEIP |
| A Spatial Information & Modelling Facility | 150,000 | NEWCASTLE | 1995 | ARC |
| Co-operative Library Project | 18,500 | NEWCASTLE | 1992 | HEIP |
| Trial of Activity Based Costing into Library and IT | 27,100 | NEWCASTLE | 2001 | HEIP |
| Upgrade of Electronic Communication Facilities | 300,000 | NEWCASTLE | 1996 | ARC |
| Arafura Digital Archive | 100,000 | NTU | 2002 | ARC |
| A Subject Gateway for Engineering and Information Technology | 100,000 | QUEENSLAND | 1999 | ARC |
| Co-operative Library Project | 18,200 | QUEENSLAND | 1992 | HEIP |
| Library Services: National Bibliographical Database - for the Development of Agriculture, Food | 30,000 | QUEENSLAND | 1993 | HEIP |

Technology, etc Serials

| | | | | |
|--|---------------|--------------------|-------------|--------------------|
| Regional Document Delivery Program | 300,000 | QUEENSLAND | 1995 | ARC |
| WEBLAW - a subject gateway for Australian secondary legal material | 100,000 | QUEENSLAND | 2001 | ARC |
| Best Practice in Australian Libraries | 44,207 | QUT | 1998 | EIP |
| Co-operative Library Project | 10,000 | QUT | 1992 | HEIP |
| Project Title | Amount | Institution | Year | Fund Source |
| Accessing Australian Computer-based Learning and Support Materials for Universities | 93,000 | RMIT | 1998 | EIP |
| Co-operative Library Project | 40,000 | RMIT | 1992 | HEIP |
| Distributed database technologies for terabyte document collections | 165,000 | RMIT | 2000 | ARC |
| Computer Information System for Careers Libraries | 27,400 | SWINBURNE | 1991 | HEIP |
| Co-operative Library Project | 10,500 | SWINBURNE | 1992 | HEIP |
| Access to French Based Research - Humanities and Social Sciences | 112,000 | SYDNEY | 1999 | ARC |
| ANGIS Regional Nodes - bioinformatics service and training infrastructure for national biological research and education | 275,000 | SYDNEY | 2000 | ARC |
| Australian Cooperative Digitisation Project, 1840-45 | 300,000 | SYDNEY | 1996 | ARC |
| Australian National Genomic Information Service | 705,000 | SYDNEY | 1992-96 | ARC |
| Australian University Museums Information Systems | 200,000 | SYDNEY | 1997 | ARC |
| Co-operative Library Project | 273,500 | SYDNEY | 1992 | HEIP |
| Library Services: National Bibliographical Database - for the Development of Medicine, Architecture, etc Serials | 75,000 | SYDNEY | 1993 | HEIP |
| Management and Administration of the | 250,000 | SYDNEY | 2002 | SII |

| | | | | |
|---|---------------|--------------------|--------------|--------------------|
| Committee on Information Infrastructure Development for Australian Higher Education | | | | |
| National Micro Economic Modelling Laboratory | 700,000 | SYDNEY | 1995 | ARC |
| Supporting microstructure and corporate finance research in the accounting and finance disciplines across 24 universities | 540,000 | SYDNEY | 2000 | ARC |
| The Changing Nature and Forms of Knowledge | 9,000 | SYDNEY | 1998 | EIP |
| The Digital Library of Australian Literature (Reserve) | 140,000 | SYDNEY | 2001 | ARC |
| Australian Instructional Management Systems (IMS) Centre | 300,000 | UNE | 1999 | HEIP |
| Co-operative Library Project | 7,000 | UNE | 1992 | HEIP |
| IMS Membership | 75,470 | UNE | 2000 | HEIP |
| IMS Membership | 95,906 | UNE | 2001 | HEIP |
| Library Services: National Bibliographical Database - for the Development of Rural Serials | 7,000 | UNE | 1993 | HEIP |
| Co-operative Library Project | 8,300 | UniSA | 1992 | HEIP |
| National Aboriginal & Torres Strait Islanders Information Resources & Thesaurus Facility | 600,000 | UniSA | 1993-94;1998 | ARC |
| AustLII: Creating national and regional infrastructure for all legal research | 155,000 | UNSW | 2000 | ARC |
| Austlit: The Australian Literature Gateway-Enhancement Stage Two | 350,000 | UNSW | 2002 | ARC |
| CHEMINFO: a WWW-based site comprising an electronic database of evaluated, metadata records describing and linking national and international chemistry-related information resources | 140,000 | UNSW | 1998 | ARC |
| Project Title | Amount | Institution | Year | Fund Source |
| Co-operative Library Project | 8,800 | UNSW | 1992 | HEIP |
| Digitisation of Australian Theses | 171,500 | UNSW | 1998 | ARC |

| | | | | |
|---|---------|------|-----------|------|
| Establishment of a Collaborative Research Network on Indigenous Affairs | 250,000 | UNSW | 1996 | ARC |
| Indexing of Literary Contents of "The Bulletin (1927-87) and Selected 19th Century Australian Library Periodical Publications onto AUSTLIT" | 240,000 | UNSW | 1996-99 | ARC |
| Linking University Library System | 130,000 | UNSW | 1991 | ARC |
| National Information Access to Asian Resources Project: Japan | 150,000 | UNSW | 1995 | ARC |
| The Australian Legal Information Institute | 570,000 | UNSW | 1991;1995 | ARC |
| The Australian Literature Electronic Gateway (ALEG) * enhancement project | 650,000 | UNSW | 2000-01 | ARC |
| Co-operative Library Project | 200,000 | UOW | 1992 | HEIP |
| Research in Natural Resources and Mining Law | 185,000 | UOW | 2001 | ARC |
| AustLII: Creating national and regional infrastructure for all legal research | 462,000 | UTS | 2001-02 | ARC |
| Equity and the Use of Communications and Information Technology in Higher Education | 46,455 | UTS | 1999 | EIP |
| A national database of electronic finding aids for Australian literary manuscript collections | 125,000 | UWA | 2000 | ARC |
| Australian Research Libraries Collection Analysis Project | 236,000 | UWA | 2002 | SII |
| Capital Markets Research | 342,000 | UWA | 1994;1996 | ARC |
| Co-operative Library Project | 57,200 | UWA | 1992 | HEIP |
| Library Services: National Bibliographical Database - for the Development of General Serials | 29,000 | UWA | 1993 | HEIP |
| Specialised Philosophy Research Collection | 50,000 | UWA | 1996 | ARC |
| Co-operative Library Project | 11,100 | UWS | 1992 | HEIP |
| Co-operative Library Project | 5,300 | VUT | 1992 | HEIP |

| | | | | |
|---|---------|------------|-----------|-----|
| National Asia Pacific Economic and Scientific Database | 200,000 | VUT | 1997 | ARC |
| The Italian-Australian Records Project: a Preservation Retrieval and Access System | 250,000 | VUT | 1996;2001 | ARC |
| Unlocking Regional memory: An electronic Archive network | 100,000 | WOLLONGONG | 2002 | ARC |

TOTAL – all funds 32,430,601

| | |
|---------------------|-------------------|
| Total – ARC | 19,660,500 |
| Total – CDP | 1,493,000 |
| Total – EIP | 350,435 |
| Total – HEIP | 7,515,191 |
| Total - SII | 3,611,475 |

APPENDIX C

CRITERIA FOR ASSESSING PROPOSALS

The Systemic Infrastructure Initiative is a result of *Backing Australia's Ability - An Innovation Action Plan for the Future*. It seeks to encourage innovative approaches which will support world-class research and research training at Australian universities link and bring sector-wide strategic benefits by expanding access to shared facilities or high priority investments across the higher education sector. The initiative is restricted to the support of projects with a demonstrated relationship to research or research training.

Past distribution of funding for the development of the information infrastructure has been largely on a competitive basis with individual institutions, or groups of institutions, proposing projects. The Hon Dr Brendan Nelson, Minister for Education, Science and Technology decided that a strategic approach would be used for the allocation of funding for 2003. The Minister established the Management and Administration of the Higher Education Bandwidth Advisory Committee and the Information Infrastructure Advisory Committee to advise on strategic directions and the allocation of funding.

The need to provide systemic access to high quality scholarly information infrastructure components which will optimise support for Australian higher education researchers irrespective of their institutional affiliations, geographical location or discipline, guided the Information Infrastructure Advisory Committee.

The Advisory Committee recognised the importance of the Australian information infrastructure:

- being comparable with that available to researchers internationally
- adhering to international standards
- taking advantage of international developments
- promoting the creation and dissemination of Australian research.

The Committee supported the imperative of identifying priorities and doing so in consultation with key stakeholders. While recognising the importance of experimentation to innovation, the Committee was mindful of the need to use available resources as optimally as possible.

In general funding will not be available for projects which are considered to duplicate the development of concepts, services or technology which exist already. This does not, however, preclude the use of an existing mechanism to provide services to Australian researchers or to provide better access to Australian research outcomes.

It is not intended to fund multiple projects designed to deliver similar outcomes. Where more than one bid is submitted for an expression of interest, potential participants will be encouraged to form a consortium so that the maximum number of stakeholders is involved.

The basic criteria for projects supported by the Systemic Infrastructure Initiative are:

- demonstrated benefit to the support of research activities or to research training
- provision of sector-wide benefits by expanding access to shared facilities

Other criteria which may be used to identify priorities and/or projects include (where applicable):

- cost effectiveness and ability to generate savings or productivity gains through its application
- use of appropriate international standards
- effectiveness of collaboration with international or industry partners
- potential sustainability of the project beyond the initial funding stage
- commitment by a majority of universities prepared to contribute to the project

In accordance with Systemic Infrastructure Initiative requirements, one university will be required to lead each project and take responsibility for funding and reporting. Other universities and industry partners may be involved where appropriate.

Criteria which might be used to determine the suitability of an institution to lead a project might include:

- successful development of previously funded projects
- provision of well developed project and business plans
- previous experience and success of the project participants to work together and achieve stated objectives

Operational procedures

- stakeholder opinion will be sought to identify strategic areas of the infrastructure requiring development and the means of effectively achieving the desired outcomes.
- the Advisory Committee will identify priority areas for funding
- specifications of the outcomes which need to be achieved will be prepared and circulated to universities
- individual universities and consortia of universities will be invited to tender for each projects
- tenders will be required to present a full business plan including the objectives, need, benefits, cost and completion schedule for the project
- the Advisory Committee may select a contractor from among the tenders received, or may negotiate with one or more universities to undertake the project.
- all successful contractors will be required to submit progress reports as specified by DEST and to submit to external evaluation.

APPENDIX D**RESOURCE DISCOVERY MECHANISMS****DISCOVERY AND MANAGEMENT OF RESEARCH INFORMATION PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified improving the discovery and management of research information as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- resource discovery mechanisms
- subject gateways
- research information skills training

Background

There is a rapidly growing preference for information to be easily accessible online from wherever an individual can connect to the Internet. Demand for these facilities has developed with the globalisation of university activities and more flexible approaches to work practices. University libraries have met some of this demand by the provision of Web access to commercially available datasets.

Part of the demand has also been met by developing academic subject gateways such as AVEL (Australasian Virtual Engineering Library) and Austlit (Australian Literature Gateway). At present, searchers have to interrogate each gateway separately or use facilities such as Google to search across them. The all-purpose search engines, however, provide a mass of citations much of which is often of little relevance.

In order to assist researchers to find relevant Australian online information resources across all of the gateways, the development of a simple, unmediated, single search access point is desirable. This approach has been implemented successfully in the United Kingdom where it was funded by the Joint Information Systems Committee (JISC).

The Australian Research Council and the Systemic Infrastructure Initiative have funded the AARLIN Project (Australian Academic and Research Library Information Network) which has the capacity to provide a single point for searching by providing links to each gateway. There are currently some eighteen gateways providing access to Australian material and many others giving access to international data. The development of a resource discovery mechanism to harvest metadata from subject gateways and other resources hosted in Australia has the potential to reduce the number of links which AARLIN needs to maintain. This will reduce the operating overheads of AARLIN and contribute to its efficiency.

Although future developments in Web technology will improve the ability to search automatically across a range of Web-based electronic resources, it is likely that a resource discovery service of this kind will be required for some years. In the meantime, it is desirable to improve access to existing subject gateways which have been publicly funded. These gateways may include those maintained by agencies outside the higher education sector but which have the capacity to support research activities.

Aims

- an electronic resource discovery service to facilitate the identification and use of research resources aggregated in subject gateways maintained by Australian institutions
- improved and more efficient access to information resources by researchers
- high-quality alternative to commercial search engines which may produce unreliable results

Benefits

- increased awareness of Australian research
- utilises international standards and protocols
- enhancement of the investment already made in subject gateways
- links to Australian Digital Theses Program, e-print repositories project, Australian Publications and Manuscripts project, AARLIN project.

Action

Seek expressions of interest from universities for the coordination of the project over a 6 month period commencing February 2003

Notional SII allocation: \$250,000 - 300,000.

APPENDIX E**SUBJECT GATEWAYS****DISCOVERY AND MANAGEMENT OF RESEARCH INFORMATION PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified improving the discovery and management of research information as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- resource discovery mechanisms
- subject gateways
- research information skills training

Background

Subject gateways are the World Wide Web progeny of the library subject catalogue. They seek to provide easier access to network-based resources in defined subject areas. In their simplest form, they are sets of Web pages containing lists of links to resources. Others provide simple search facilities and the more sophisticated services use resource databases and various indexes searchable through Web-based interfaces.

Subject gateways have been developed in Australia (<http://www.nla.gov.au/meta/sg/gateways.html>) and internationally, particularly, in the United Kingdom (<http://www.hw.ac.uk/libwww/irn/pinakes/pinakes.html>). These gateways range from subject-specific to broad discipline sites and are supplemented by services compiled and maintained by a host of government agencies and private-sector groups.

Many of these services are highly successful and are used extensively by a broad cross section of the academic community as well as by members of the general community. Experience over the past five years indicates that there are issues related to the effectiveness and viability of the gateway approach to information resource discovery.

The issues include:

- sustainability – except for the most narrowly defined sites, gateways require constant maintenance and some have become dormant since the end of their establishment funding. Others exist on the charity of their host institutions while a few raise at least part of their costs by access subscriptions.
- searching - users tend to search each gateway singly and, for the less savvy, there is a tendency to assume that the gateway provides access to everything related to its nominated subject area. Given the trend toward a multidiscipline approach to scholarship, cross-searching of gateways is desirable but its efficiency is currently limited. This is being addressed in part by the ARC-funded AARLIN Project and will be taken further by the Resource Discovery Mechanisms project (Appendix D).
- intellectual property – gateway developers have a considerable investment in the metadata and metadata schemas which underpin the effectiveness of their services. Developing this investment is costly. Emerging Web technologies have the capacity to reduce at least some of this burden and need to be investigated.

- content – Australia has a limited capacity to develop and maintain subject gateways. Most of the gateways developed by the Australian higher education sector are careful not to duplicate international effort and there is close collaboration. What is currently missing, however, is a strategic approach to the creation of new gateways so that they address the needs of national priority research areas.

Issues relating to searching across gateways will be addressed by the Resource Discovery Mechanisms Project. Sustainability issues are likely to be addressed in part by the effectiveness of individual services and the willingness of higher education institutions to re-allocated funding to support them. They are also linked to the emergence of new Web searching technologies.

While it may be desirable to consider support for new gateways which address the needs of national priority research areas, further investigation of the emerging technologies is required to ensure that new and existing services are viable. A two phase approach is recommended:

Phase One

Aims

- evaluate the effectiveness of existing Australian subject gateways hosted by higher education institutions
- survey Web searching technology developments, nationally and internationally
- analyse the needs of the nationally identified research priority areas

Benefits

- report on the implications for the future of Web searching
- provision of strategy for any future investment in subject gateways
- utilises international standards and protocols
- links into ARC LIEF by providing guidelines on requirements of gateway-related proposals

Phase Two

Depending on the outcomes achieved by Phase One, infrastructure funding may be allocated to

- development or implementation of new Web search technologies
- establishing new subject gateways to support nationally identified priority research areas

Action

Seek expressions of interest from universities for the coordination of tasks identified in Phase One over a 6 month period commencing February 2003.

Notional SII allocation: \$75,000 - \$150,000.

Identify funding to address the outcomes of Phase One if necessary.

Notional SII allocation: unknown

APPENDIX F**RESEARCH INFORMATION SKILLS TRAINING****DISCOVERY AND MANAGEMENT OF RESEARCH INFORMATION PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified improving the discovery and management of research information as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- resource discovery mechanisms
- subject gateways
- research information skills training

Background

The effectiveness and efficiency of researchers in Australia depends on a range of factors not the least being their ability to locate, analyse and deploy information. These skills were traditionally part of the research training process conducted by postgraduate supervisors and by senior mentors within academic units. The effectiveness of this process has been affected by a variety of issues including growth in workloads, intense competition for resources and the application of information and computer technologies. Individuals well-versed in print-based research are often not as efficient in the Web-based environment.

Despite claims that research information skills training needs to be institutionally and/or discipline specific, there are generic competencies which transcend these boundaries. These competencies can be acquired through the provision of Web-based, self-paced online tuition. Such programmes enable researchers to acquire skills relevant to their needs at the time they are required and at their convenience. To be effective, however, they need to be complemented by opportunities to interact with specialists in research information such as other researchers or librarians. Face to face programmes may be available in parallel at some institutions.

Some institutions already provide information skills training for postgraduate students and for some academic staff. Others are contemplating either developing their own programmes or acquiring packages from elsewhere.

Aims

- evaluate existing research-oriented information skills tuition programmes
- provide a Web-based, self-paced online facility which can be used by academic staff and postgraduate research students and to interact with specialists in research information such as other researchers or librarians to enhance their research information skills.
- trial and evaluate the course in a range of institutions and disciplines

Benefits

- contributes to improved research training
- increases effectiveness of researchers and utilization of investment in information infrastructure
- builds on investment in projects involving Resource Discovery Mechanism, Subject Gateways, Humanities & Social Sciences Resources, Refereed Journal Citations, Non-Bibliographic Data, E-Print

Repositories, Digital Theses, E-Publishing and Australian Publications & Manuscripts

Action

Seek expressions of interest from universities for the coordination of the project over a 24 month period commencing February 2003.

Notional SII allocation: \$500,000 - \$550,000.

APPENDIX G**HUMANITIES AND SOCIAL SCIENCES RESOURCES****ACCESS TO RESEARCH RESOURCES PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved access to research resources and publications as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- humanities and social sciences resources
- refereed journal citations
- non-bibliographic digital data
- collaborative storage facilities for research publications

Background

Publishers in the humanities and social sciences have been slower to adopt digital publishing than those in science, technology and medical disciplines. This is partly due to the nature of the publication process but mostly relates to the economics of STM publishing. As a consequence, there has been a considerable shift in the allocation of library resources to support digital publications for the STM sectors of the academic community. This has been partly evident in the declining acquisition of monographic publications nationally and internationally.

The ability of the Systemic Infrastructure Initiative to address declining monograph acquisitions is limited. Work has been commissioned to determine the extent to which Australian university collections overlap. This work is yet to be finalised but a study of the Group of Eight library collections indicates that duplication is limited. What remains to be determined is the effect on research of the non-purchase of information resources and what new strategies can be implemented to overcome those deficiencies.

The Department of Education, Science and Training has funded study of Changing Research Practices in the Electronic Information and Communication Environment. This project is due to be completed in mid-2003 and will provide some background data but further investigation of individual disciplines will be required.

Limited surveys of researcher needs were conducted by the National Library through its National Collections Taskforce. Although these surveys were restricted to three disciplines (English, Psychology and Physics) in a limited number of universities, they suggested that researchers in the humanities and social sciences were experiencing difficulty accessing their literature and that those in smaller and remote institutions were often at the greatest disadvantage.

Many of the digital resources currently applicable to the humanities and social sciences are either highly specialised, too costly for most institutions to acquire or have already been acquired by the majority of institutions. The Council of Australian University Librarians was invited to consult with the academic community and to recommend resources which could be acquired under the Systemic Infrastructure Initiative. A number of options were identified.

The highest priority was given to JSTOR which is an initiative of a group of research libraries in North America. The consortium has undertaken to build a reliable and

comprehensive digital archive of important scholarly journals. There are currently 242 journals in arts, science and business with plans to add more titles and subject areas.

The journals are arranged into broad discipline collections each of which can be purchased on the basis of a once off archival fee plus a small annual fee for access to the archive and to new issues of titles in the collection.

If negotiations for *JSTOR* are unsuccessful, other products should be explored.

Aims

- providing all universities with access to the same corpus of journals
- improving access to journals particularly in remote universities
- filling gaps in existing library collections
- support for the humanities and social sciences

Benefits

- acquisition of JSTOR would complement the Research Resources Storage Project. Institutions could elect to dispose of their print journal holdings and use the storage facility as a national archive for the titles.
- reduction in the long-term capital and operating costs associated with the storage and care of journal collections
- potential to increase access to Australian research publications by negotiating with JSTOR to include more Australian titles in their product.
- addressing preservation issues such as mutilated pages and the longer term deterioration of paper copies.

Action

Commence negotiation for the national acquisition of JSTOR

Notional SII allocation: \$3,000,000 - \$3,500,000

Participant contribution: annual JSTOR subscriptions

APPENDIX H**REFEREED JOURNAL LITERATURE****ACCESS TO RESEARCH RESOURCES PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved access to research resources and publications as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- access to digital humanities and social sciences resources
- access to refereed journal citations
- access to non-bibliographic digital data
- collaborative storage facilities for research publications

Background

The research process relies heavily on the use of refereed journal publications and all universities strive to provide access to as many relevant titles as possible. Subscriptions to these publications tend to be expensive and they are often initial targets for cancellation. It is not possible to use Systemic Infrastructure funding to support ongoing subscriptions although funding can be used for one-off payments for backsets.

Of the options available for purchase, the *Web of Science* produced by the Institute for Scientific Information was identified as a high priority. This is a high quality research resource which supports most research areas in addition to science has been acquired by 28 universities. Annual subscriptions and backfiles are expensive and most universities have been able to acquire only a five year backfile. This is insufficient to support research needs. Acquisition of a further five year backfile for all current subscribers would improve support for research in 75% of Australian universities.

Eighteen of the twenty eight universities which have current subscriptions to the ISI *Web of Science* indicated 'in principle' support for the acquisition of the back files to 1945. While these files are considered valuable for research, the general consensus was that the cost (approximately A\$13.4 million) was too high and that the information could be obtained from print indexes although not conveniently.

The Council of Australian University Librarians supports the acquisition for all current subscribers of either a five or ten year back file in addition to their current archive file. This support is dependent on the cost of the file and was considered a lower priority than the acquisition of JSTOR.

If negotiations for *Web of Science* are unsuccessful, other products should be explored including backsets of Elsevier Science journals published digitally and *ScifinderScholar*.

Aims

- increasing access to refereed journal
- improving access to journal literature particularly in remote universities
- filling gaps in existing library collections
- support for the sciences, health, humanities and social sciences disciplines

Benefits

- builds on existing investment by individual universities
- increases access to research resources
- provides access comparable to peer institutions internationally

Action

Commence negotiation for the acquisition of backfiles of ISI Web of Science for current subscribers.

Notional SII allocation: \$3,000,000 - \$3,500,000

Participant contribution: annual Web of Science subscriptions

APPENDIX I**NON-BIBLIOGRAPHIC DIGITAL DATA****ACCESS TO RESEARCH RESOURCES PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved access to research resources and publications as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- digital humanities and social sciences resources
- refereed journal citations
- non-bibliographic digital data
- collaborative storage facilities for research publications

This initiative has two aspects:

- provision of access to non-bibliographic digital information resources such as geospatial, census, music, sound data
- provision of mechanisms by which data collected as part of specific research projects can be made available for use by other scholars

Digital data is increasingly an important input to the research process as the raw material of many projects. This is principally in the sciences but also has considerable application in the social sciences. The data may be manipulated, combined with other data, processed and re-processed to achieve research outcomes and to draw new conclusions.

In Australia, considerable data is generated from within research agencies and institutions, many of which are government funded. The Commonwealth Government has embarked on an initiative to provide wider access to spatial data produced within its aegis.

Consultation with a sample group of scientists indicated that a variety of datasets for systemic acquisition and access should include:

- geological data
- seismic data
- geomorphological data
boundary information
- census data
- various state and territory data.

Aims

- increase access to data necessary for projects involving Australian economic, social and environmental research
- facilitate discovery of data through the creation of metadata for previously inaccessible data.

Benefits

- opportunity to leverage sector-wide usage and interest
- ability to stimulate research through easier access to data that is distinctively Australian
- capacity to advantage researchers directly at their desktop
- avoid duplication of effort and data acquisition.

- complements Commonwealth Government initiatives to increase accessibility to data.
- supplements systemic information infrastructure projects involving the acquisition of journal citation information

Action

Phase 1

Conduct a survey of researchers to determine priorities for data set acquisition
Identify the technical requirements for access to the identified data sets.

Phase 2

Seek expressions of interest from universities for the negotiation of the acquisition commencing February 2004.

Notional SII allocation: \$2 million

APPENDIX J**COLLABORATIVE STORAGE FACILITIES FOR RESEARCH PUBLICATIONS****ACCESS TO RESEARCH RESOURCES PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved access to research resources and publications as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- humanities and social sciences resources
- refereed journal citations
- non-bibliographic digital data
- collaborative storage facilities for research publications

Background

Australian universities have a considerable investment in library collections and buildings. Many institutions have constraints on capital funding and need to re-purpose existing space in order to accommodate new services. The acquisition of digital publications provides opportunities for some print materials, especially journals, to be relegated to storage. Collaborative storage facilities have already proven their efficiency in South Australia and Victoria but further capacity is required to allow more extensive relegation and the better use of resources.

The Council of Australian University Librarians supports the development of collaborative storage facilities as a strategic means of improving the management of the national research collection and of assisting participating universities to redevelop space for other purposes such as information/learning commons.

To encourage the establishment and use of the national facility, it is proposed that all capital and initial establishment costs be covered by the Systemic Infrastructure Initiative. Participating institutions, however, would be required to make a five year commitment to the operation of the facility. Before a call for expressions of interest are issued, stakeholders would be required to agree to abide by a set of protocols including:

- implementation of collection rationalization among existing libraries and library stores
- adoption of a concept of 'virtual' national storage as well as physical facilities. This would include not storing items in the national store which another institution (such as the National Library) has a mandate to acquire and make available.
- clear enunciation of the operating principles
- provision of a sound business plan.

Aims

- provide a national facility for the storage of research material which is little used
- rationalise the library holdings, especially where digital copies are available, of university libraries

Benefits

- preservation within Australia of important research materials at risk of disposal due to high storage costs and relatively low use

- 'best last copy' policy permits system-wide storage economies
- re-use of on-campus library storage space for new activities
- builds on investment in Humanities and Social Sciences Resources project

Action

Seek expressions of interest from universities and their partners for the coordination of the project over a 24 month period commencing June 2003.

Notional SII allocation: \$4,000,000 - \$5,000,000.

Participant contribution: ongoing operation of the facility

APPENDIX K**E-PRINT REPOSITORIES****CREATION AND DISSEMINATION OF AUSTRALIAN RESEARCH PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved mechanisms for the storage and dissemination of Australian research outcomes as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- e-print repositories
- digital theses
- electronic publishing
- management of access to digital resources

Background

Institutional repositories, by capturing, preserving, and disseminating a university's collective intellectual capital, serve as meaningful indicators of an institution's academic quality. Under the traditional system of scholarly communication, much of the intellectual output and value of an institution's intellectual property is diffused through thousands of scholarly journals. An institutional repository concentrates the intellectual product created by a university's researcher, making it easier to demonstrate its social and financial value. While institutional repositories centralize, preserve, and make accessible an institution's intellectual capital, at the same time they form part of a global system of decentralized, distributed repositories. This attribute is central to the role repositories can play in a disaggregated model of scholarly publishing. (Crow, Raym "The Case for Institutional Repositories" Draft Paper. Washington: SPARC, 2002, p 4)

Aims

1. Facilitate creation of institutional repositories by
 - exploring the potential for institutional or discipline-based e-print repositories of Australian research
 - developing a national model for institutional E-Print repositories.
 - creating and providing templates to participants, including submission templates.
 - identifying international standards for use with the contents of E-Print repositories.
 - providing a model technical framework.
 - developing and providing a model server specification.
 - developing and providing information and guidelines about copyright/intellectual property rights requirements.

2. Provide support services for institutional repositories which may include:
 - assisting with the inclusion of content
 - briefing and publicity materials for local use including roadshows.
 - an appropriate rights management system for institutional repositories.
 - regularly updated technical, copyright and other FAQs
 - advice on long-term preservation of and access to content.
 - marketing and promoting the service

- online help desk facilities to provide technical assistance relating to the local and national repositories, the discovery service, and intellectual property issues.
 - a project Web page for distribution of information about the project, including access to published guidelines for setting up E-Print repositories.
 - advice on the assignment of a persistent identifier code to each E-Print
 - identifying requirements for software.
 - facilitating national discussion through lists, forums and the project Web site.
3. Facilitate the provision of a national harvested metadata repository which
- links OAI-compliant trusted digital repositories to ensure long-term access and preservation of research output through a framework of digital repositories
 - complements work undertaken by the National Library of Australia
 - maximises interoperability
 - ensures Z39.50 compatibility
 - links to the Australian Digital Theses Program
4. Provide a national resource discovery service including
- providing an appropriate search interface
 - contributing to other networks
 - ensuring appropriate local institutional and national “branding” of the service
 - providing appropriate subject-based access.

Benefits

- provision to Australian scholars of an efficient means of archiving the results of their research
- access to Australian research on a free-to-user basis
- increased awareness of Australian research
- creation, population and development of e-print repositories by at least 15 universities
- provision of practical assistance and national co-ordination
- establishment of global liaison to share and contribute to best practice in the creation, promotion and development of E-Print repositories
- complements investment in projects relating to Resource Discovery Mechanisms, Digital Theses, E-Publications, Australian Publications and Manuscripts, Management of Access to Digital Publications.

Action

Seek expressions of interest from universities and their partners for the coordination of the project over 18 – 24 months commencing February 2003.

Notional SII allocation: \$1,500,000 - \$2,000,000 including funding to assist institutions to make content available.

Participant contribution: sustainability of the repositories after project completion

APPENDIX L**DIGITAL THESES****CREATION AND DISSEMINATION OF AUSTRALIAN RESEARCH PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved mechanisms for the storage and dissemination of Australian research outcomes as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- e-print repositories
- digital theses
- electronic publishing
- management of access to digital resources
- Australian publications and manuscripts

Background

In 1997-1998, the Australian Research Council - Research Infrastructure Equipment and Facilities (RIEF) Scheme provided a grant to establish a distributed database of digital versions of theses produced by the postgraduate research students at Australian universities. By 16 September 2002, thirteen universities had provided full-text files of 630 theses to the Program. The relatively small number of submissions reflects the effort required to prepare theses especially those not already in digital format. It also reflects difficulties with the thesis regulations which vary from institution to institution. Despite this early stage, the database has attracted an average of 1794 hits per day over the last six months, peaking at 3858 on 8 October 2002. It is used 24 hours a day, demonstrating that it is beginning to achieve its aim of promoting Australian research theses.

The Deans of Graduate Business Schools and other bodies have identified a need to provide more extensive access to Australian research theses. Although most universities include records of theses in the Australian National Bibliography, they are not easily searched as a set and there is no means of locating all theses in a particular discipline. A union list was published by the University of Tasmania until 1991. Making this list, and details of subsequent theses, available online would contribute to a greater awareness of Australian research, help promote the work of individual researchers and make available research which may not be otherwise published.

The program will provide access by, and promote Australian research to, the international research community by making thesis information more available. Present experience, however, suggests that retrospective digitisation of all theses to be impractical. Institutions will also need to consider the feasibility of maintaining only digital copies of future theses and to consider archiving issues. There may be some potential for recovering some costs by marketing access to theses from international requesters.

Aims

- improved awareness and use of Australian research theses.
- single interface to all Australian research theses and their abstracts where available
- more manageable means of making older theses available
- online metadata creation tutorial for graduate students

The first phase of this project would involve investigation of current practice including:

- reviewing the mechanisms available for locating and obtaining the text of Australian theses
- considering the effectiveness of these mechanisms and recommend ways in which they can be improved
- advising on the relative merits of maintaining a database of only full-text digitised theses, abstracts only with digitisation on demand or a mix of approaches

The second phase would involve implementing the findings. This may involve:

- redevelopment of the Australian Digital Theses Program including the adoption of Open Systems protocols
- providing online access to all theses through ADT
- supporting universities to provide digital abstracts of their theses
- identifying key theses (individually or in discipline groups) for priority digitisation
- providing support services, including training in metadata creation, for institutions establishing theses repositories

Benefits

- provision to Australian scholars of an efficient means of archiving their digital theses
- access to Australian research on a free-to-user basis
- increased awareness of Australian research
- provision of practical assistance and national co-ordination
- establishment of global liaison to share and contribute to best practice in the creation, promotion and development of Digital Theses repositories
- complements investment in projects relating to Resource Discovery Mechanisms, E-Print Repositories, E-Publications, Australian Publications and Manuscripts, Management of Access to Digital Publications.

Action

Seek expressions of interest from universities and their partners for the coordination of the project over 24 months.

Notional SII allocation: \$800,000 - \$950,000 including at least \$500,000 to assist institutions to make content available.

Participant contribution:

- extraction of and conversion of data to enable single point access
- continuation of the repositories after project completion

APPENDIX M**ELECTRONIC PUBLISHING****CREATION AND DISSEMINATION OF AUSTRALIAN RESEARCH PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved mechanisms for the storage and dissemination of Australian research outcomes as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- e-print repositories
- digital theses
- electronic publishing
- management of access to digital resources
- Australian publications and manuscripts

Background

It is increasingly difficult for researchers to find a publisher for monographic works which are seen to appeal only to a scholarly or academic market. Those that are published are frequently issued in small print runs and are quickly remaindered if they fail to sell within a short period. Others are published only if a pre-specified number of copies are ordered, usually by libraries, prior to publication. These constraints particularly affect researchers in the humanities and social sciences with the greatest effect on early career researchers and those working in non-traditional or highly specialised areas.

In the distant past, university presses would have been expected to have published at least some titles purely on their academic merits. The costs were off-set against revenue from better selling titles, often textbooks, or from subsidies received from the university. With a few exceptions, Australian universities no longer maintain their own commercial publishing facilities. The cost of maintaining traditional university presses is not sustainable especially if the product list is comprised predominantly of academic titles.

To get published, researchers often have to waive their copyright and intellectual property in perpetuity and for all publication formats. Alternatively, they may be required to underwrite all or part of the publication costs. Funding is often garnered from multiple sources – subsidies from the university or from a learned or professional society, consulting revenue or from the researcher's own resources. In addition to these fees, researchers often provide extensive unpaid assistance to publishers in their role as referees, editors, reviewers and proofreaders. Authors are usually expected to provide their manuscript in a digital format ready for publication.

As a result of the barriers to publication, many academically sound but less commercially viable works are not being published. Researchers do deals with commercial publishers, convert their work to a series of journal articles and risk losing the overall coherence of their research or have them printed and distribute them free of charge risking allegations of vanity publishing.

Technology is now available to enable a reconceptualisation of the scholarly publishing process including the involvement of commercial publishers, the format in which works are presented and disseminated, the role of universities and the academic community and the way in which works published in non-print formats are

assessed and recognised. The establishment of electronic publishing facilities by universities will not eliminate commercial publishing although it may lead to different relationships among publishers and the academic community.

Some Australian universities have commenced investigating the feasibility of establishing or reconfiguring their university presses. While there are some institution-specific matters to be considered, the bulk of the issues are universal and are closely related to the work associated with e-print repositories, digital archives and making available digital copies of print publications and manuscripts.

To enable universities to determine the feasibility of their involvement in electronic publishing, investigation and specification of the common issues needs to be undertaken. A desirable outcome of this study would be a further project to facilitate the establishment and collaboration of digital university presses.

Phase One

Aims

- investigate current publishing activity and processes by Australian researchers
- survey of international university e-publishing ventures
- developing a model for institutional e-publishing.
- identifying international standards for use with the contents of e-presses.
- providing a model technical framework.
- developing and providing information and guidelines about copyright/intellectual property rights requirements.

Benefits

- data relating to which publishers are supporting Australian research
- identify strategies used by researchers to get published
- establishing cost to universities of supporting publishing
- knowledge of international practice and trends
- comprehensive specification of the issues, technology and costs associated with institutional e-publishing

Phase Two

Aims

- Provide support services for the establishment of institutional e-presses which may include advice on:
 - appropriate rights management systems.
 - long-term preservation of and access to content.
 - intellectual property issues.
 - technical standards
- Facilitate the development of a national harvested metadata repository and a national resource discovery service which may include the use of facilities established for e-print repositories and digital theses
- Maintain links with similar projects internationally to ensure promotion of Australian initiatives and observance of good practice
- Evaluate and report on progress

Benefits

- greater opportunity for the publication and dissemination of Australian research, particularly 'monographic' works in the humanities and social sciences
- reduced dependence on commercial publishers

- more coherent and recognised support by universities of publishing by their researchers
- increased visibility and prestige of works published by individual universities
- single interface to all Australian research published by university e-presses
- close links with other projects associated with e-print repositories and digital theses.

Action

1. Seek expressions of interest for phase one of the project over 6 months.

Notional SII allocation: \$50,000 - \$80,000

2. Seek expressions of interest from universities and their partners for the coordination of phase two of the project over 18 months.

Notional SII allocation: \$500,000 - \$800,000 including funding to assist institutions to make content available.

Participant contribution: continuation of the presses after project completion

APPENDIX N**MANAGING ACCESS TO DIGITAL RESOURCES****CREATION AND DISSEMINATION OF AUSTRALIAN RESEARCH PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved mechanisms for the storage and dissemination of Australian research outcomes as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- e-print repositories
- digital theses
- electronic publishing
- management of access to digital resources
- Australian publications and manuscripts

Background

The creation and dissemination of information resources in digital formats has significant implications in terms of establishing the identity of users, authenticating their access privileges and protecting the rights of the information creators and/or owners. These issues are made more complex by the provision of access from anywhere on the Internet and the use of service providers other than the individual's home institution. Members of the higher education sector are highly mobile and expect to be provided with facilities which allow them to operate without the strictures imposed by the physical campus.

Most networked digital resources have some form of access conditions and failure to comply with these requirements may result in loss of access and/or legal and financial penalty. This applies to those information resources purchased or licensed from an external supplier and to those resources which are created by members of the university and made available within the institution and externally.

Many of the regulating mechanisms currently in use were adapted from the print environment and presume that use will be related to particular physical locations. These are no longer sufficient and leave institutions vulnerable to the abuse of their own intellectual property rights and to inappropriate use of resources to which they have contracted access.

Several Australian higher education sector projects are already investigating aspects of the issue. These include WALAP (West Australian Libraries Authentication Project), COLIS (Collaborative Online Learning Information Services) and AARLIN (Australian Academic Research Library Network). Projects are also underway in Europe, the United Kingdom and North America to develop solutions which meet the particular and complex needs of the library and higher education environment. There is also a multitude of 'solutions' available from private enterprise nationally and internationally although many of these have been developed for specific industries or applications. Many are either not scalable, do not use recognised standards or are not sufficiently adaptable.

More adaptive approaches are needed to allow authentication/authorisation and rights management in ways which meet the differing needs of individuals and which can accommodate a variety of creator/owner requirements. These approaches need to be flexible enough to cope with rapid changes in the application of technology.

Aims

- identify a mechanism which can be used by Australian higher education institutions to manage access to digital information resources acquired from external creators/suppliers as well as those resources which are created and made available by universities and their members.
- ensure that the mechanism uses recognised international standards, can interface with access and rights management systems used by other entities and is flexible and adaptive to technological change
- implement and test the mechanism in a way which mirrors the wider Australian higher education environment and which takes account of the needs of related projects
- adapt the mechanism so that it can be implemented efficiently as a fully functioning system by universities and other agencies
- maintain links with similar projects nationally and internationally to ensure promotion of Australian initiatives and observance of good practice
- evaluate and report on progress

Benefits

- provision of a comprehensive survey of current work being undertaken national and internationally which seek to provide the higher education sector with the means of managing access to digital information resources
- development of a means by which members of the higher education sector can use a single-sign-on to access to the wide range of digital information resources needed to meet their research, teaching and learning needs.
- provision of an efficient and robust means by which universities and their members can control access to, and the integrity of, their intellectual property.
- close links with other projects associated with the creation and dissemination of digital information resources national and internationally.
- recognition of Australia as a significant contributor to the development of information access control systems.

Action

Seek expressions of interest from universities and their partners for the coordination of the project over 18 - 24 months.

Notional SII allocation: \$1,500,000 - \$2,000,000

Participant contribution: implementation and development of the mechanism after project completion

APPENDIX O**AUSTRALIAN PUBLICATIONS AND MANUSCRIPTS****CREATION AND DISSEMINATION OF AUSTRALIAN RESEARCH PROGRAMME**

The Systemic Infrastructure Initiative of the Department of Education, Science and Training has identified the provision of improved mechanisms for the storage and dissemination of Australian research outcomes as a priority for 2003. Support is available for the establishment of infrastructure mechanisms relating to:

- e-print repositories
- digital theses
- electronic publishing
- management of access to digital resources
- Australian publications and manuscripts

Background

While there is a considerable range of digital research material available from international sources, the provision of Australian material is limited especially heritage sources and retrospective publications. Much of this material will never be made available through commercial publishers as the market is not significant enough. Yet, there is a growing demand for digital access to a range of sources to support research as well as teaching and learning. Some of this demand has been met by grants from the Australian Research Council and by the efforts of individual institutions. The result, however is piecemeal.

A multiphase approach is required which includes

- survey of current practices
- identification of research requirements and priorities
- specification of standards and key issues such as copyright

The programme would complement the successful Australian Literature Gateway and other digitisation projects previously funded by the Australian Research Council as well as the digital version of *APAIS* (Australian Public Information Affairs Service) produced on behalf of the National Library by RMIT Publishing. There would also be relevance to initiatives in the archives sector to establish a national digital archive.

Aims

- develop guidelines for the digitisation of Australian material
- establish a priority list for digitisation and for the allocation of funding
- make available digitally items which are currently out of print
- increase access to Australian publications and research

Benefits

- guidelines will ensure conformance with international standards and protocols
- interaction with international organisations involved in digitisation projects
- opportunity for researchers to identify material to be digitised
- framework for digitisation and collaborative effort among Australian cultural institutions

ACTIONS

1. Liaise with the ARC and:

Seek expressions of interest from universities and their partners for the coordination of a survey of current practices and the identification of research requirements and priorities over a 9 to 12 month period

Notional SII allocation : \$80,000 - \$100,000

2. Liaise with ARC and:
Seek expressions of interest from universities and their partners for the development of guidelines concerning standards and other issues which must be address as a pre-condition of grant allocations. 6 months

Notional SII allocation : \$50,000 - \$70,000

3. In association with the ARC consider a programme for improving access to Australian publications and manuscripts in digital formats.

APPENDIX P

PROJECT SUMMARY

| PROJECT | TIME FRAME | COST |
|---|------------------|------------------------------------|
| Discovery and Management of Digital Research Resources Programme | | |
| Research Discovery Mechanisms | 6 months | 250,000- 300,000 |
| Research Subject Gateways – phase 1 | 6 months | 75,000 - 100,000 |
| - phase 2 | To be determined | |
| Research Information Skills Training | 12 months | 500,000 - 550,000 |
| Access to Research Resources and Publications Programme | | |
| Humanities and Social Sciences Resources – JSTOR | 6 months | 3,000,000 - 3,500,000 |
| Refereed Journal Citations – ISI | 6 months | 3,000,000 - 3,500,000 |
| Non-Bibliographic Data | To be determined | 1,500,000 - 2,000,000 |
| Storage facilities | 24 months | 4,000,000 - 5,000,000 |
| Creation and Management of Australian Research Programme | | |
| E-print repositories | 18-24 months | 1,500,000 - 2,000,000 |
| Digital Theses | 24 months | 800,000 - 950,000 |
| E-publishing – phase 1 | 6 months | 50,000 - 80,000 |
| - phase 2 | 18 months | 500,000 - 800,000 |
| Managing access to digital publications | 18-24 months | 1,500,000 – 2,000,000 |
| Australian Publications and Manuscripts | | |
| - phase 1 | 9 – 12 months | 80,000 - 100,000 |
| - phase 2 | 6 months | 50,000 - 70,000 |
| - phase 3 | To be determined | |
| total | | \$16,805,000 - \$20,950,000 |
| Programme management and evaluation | 24 months | 300,000 |

Draft Funding Schedule

| Project | 2003 | | 2004 | |
|--|-----------|---------|-----------|---------|
| Research Discovery Mechanism | 300,000 | | | |
| Subject Gateways | | | | |
| Phase 1 | | 100,000 | | |
| Phase 2 | | | | ??? |
| Skills Training | 150,000 | 250,000 | 150,000 | |
| Humanities & Social Sciences Resources | 3,500,000 | | | |
| Refereed Journals | 3,500,000 | | | |
| Non-Bibliographic Data | | | | |
| Phase 1 | | 50,000 | | |
| Phase 2 | | | 1,000,000 | 950,000 |

| | | | | |
|---|------------------|------------------|------------------|------------------|
| Storage Facilities | 500,000 | 1,500,000 | 2,000,000 | 1,000,000 |
| E-print Repositories | 500,000 | 500,000 | 500,000 | 500,000 |
| Digital Theses | | 250,000 | 400,000 | 300,000 |
| E-Publishing | | | | |
| Phase 1 | 80,000 | | | |
| Phase 2 | | 200,000 | 300,000 | 300,000 |
| Managing Access to Digital Publications | 500,000 | 750,000 | 750,000 | |
| Australian Publications & Manuscripts | | | | |
| Phase 1 | | 100,000 | | |
| Phase 2 | | | 70,000 | |
| Phase 3 | | | | ??? |
| Total cost | 9,030,000 | 3,700,000 | 5,170,000 | 3,050,000 |
| Programme Management and Evaluation | 100,000 | 50,000 | 100,000 | 50,000 |